Bangalore water supply and sewerage board

Kapila Bhavan, 11th main, 35th cross, 4TH T Block, Jayanagar , Bangalore.

TenderDocumentfortheworkof

“The work of construction of Roads, drains, Pathways & RWH pits works at Janatha Colony, Doddakannelli, AECS layout-Kudlu & Singasandra Reservoir & Pump house Premises.”

https//:www.eproc.karnataka.gov.in

Office of Executive EngineerPROJECT-3 DIVISION,
Kapila Bhavan, 11th main, 35th cross,
4TH T BLOCK, JAYANAGAR, 560041
Telephone – 080 22945237 ; mail – eecmc4@bwssb.gov.in

Executive Engineer,
PROJECT-3 DIVISION,
Kapila Bhavan, 11th main, 35th cross,
4TH T BLOCK, JAYANAGAR, 560041

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BANGALOREWATERSUPPLYANDSEWERAGEBOARD
Office ofThe Executive Engineer PROJECT-3 DIVISION
Kapila Bhavan, 11th main, 35th cross, 4TH T Block, Jayanagar , Bangalore.

INVITATIONFORTENDER

(ONLYTHROUGHE-PROCUREMENTTENDERING)

IFTNo.: BWSSB / EE (PROJECT-3) / PB /614/ 2022-23Dtd: 09 /09/2024

E-ProcurementTenderNotification

The***ExecutiveEngineer(Project-3) Division, BWSSB Bangalore*** invites Item Wise rateE-ProcurementTendersinTwoCoverSystemfromEligibleregisteredContractorsofBWSSB/ KPWD/KUWS&DB/KUIDFC/BBMP/BDAforthe"The work of construction of Roads, drains, Pathways & RWH pits works at Janatha Colony, Doddakannelli, AECS layout-Kudlu & SingasandraReservoir & Pump house Premises."

"

AmountputtoTender-Rs. 99,96,014/-(Including of GST)

Periodofview/DownloadofTenderDocumentisfrom 13.09.2024 to 18.09.2024 upto16:00hrs.LastDateforuploadingtenderdocumentsis 18.09.2024 Thedetailsregardingthetender and participation in thee-Procurement process can be obtained by logging on to website**www.eproc.karnataka.gov.in**

Executive Engineer,
PROJECT-3 DIVISION,
Kapila Bhavan, 11th main, 35th cross,
4TH T BLOCK, JAYANAGAR, 560041

TENDER REFERENCE	“Thework of construction of Roads, drains, Pathways & RWH pits works at Janatha Colony, Doddakannelli, AECS layout-Kudlu & Singasandra Reservoir & Pump house Premises.” No.BWSSB/EE-P-3/PB/ 614 /2024-25 Dt.09.09.2024
PERIODOFVIEW/ DOWNLOADOFTENDER DOCUMENT	From: 13.09.2024 TO 18.09.2024
LAST DATE FOR UPLOADINGTENDER DOCUMENTS	18.09.2024 Up to 16.00 Hrs.
ADDRESSFORCOMMUNICATION	Office of the Executive Engineer(Projec t-3Division) BangaloreWaterSupply&SewerageBoard, G rd Floor, Kapila Bhavan, 11th main, 35th cross, 4th T block, Jayanagar, Bangalore-560041

BANGALOREWATERSUPPLYANDSEWERAGEBOARD
Office ofThe Executive Engineer(Project-3) Division
GrdFloor,Kapila Bhavan, 11th main, 35th cross,4th T block, Jayanagar, Bangalore-560041

INVITATIONFORTENDER
(ONLY THROUGH E-PROCUREMENT TENDERIN)
No.: BWSSB / EE (PROJECT-3) / PB /614/ 2022-23Dtd: 09 /09/2024

TheExecutiveEngineer(Project-3)Division,BWSSBinvites tenders from eligible tenders registered in **e-Procurement** process with **Two Cover**tender procedure in line with the Rule 28 of the KTPP Act.The details regarding theircapability to undertake the tender (as detailed in ITT Clause 3 & 6), which will be openedfirst and the second cover containing the price tender will be opened only if the Tenderer isfoundto be qualified to execute the tender work. The tenders are advised to note theminimumqualificationcriteriaspecifiedinClause3of the instructions to Tenders toqualify for award of the contract.

1. Tenderdocumentscanbeview/downloadfrome-Procurementportalfrom**13.09.2024**to **18.09.2024**. Interested Tenders may obtain further information at the address mentionedbelow.

2. Tenders must be accompanied by Earnest Money Deposit specified for the work in the Tablebelow. EMD will have to be in any one of the forms as specified in the Tender document andshallhave to bevalid for 45 daysbeyond the validity ofthe tender.

3. The last date and time for receipt of tenders in the Electronic Tender Box on the website(www.eproc.karnataka.gov.in)is**18.09.2024 upto16:00hrs**.Thetechnicalbidswillbeopenedon**20.09.2024**at**12:00PM**. Ifthebid-openingdayremainsaspublicholiday,bidswill be opened on the next working day at the original stipulated time.
4. Other details can be seen in the tender documents

Sl. No	Name of work	Approx. Amount put totender	E.M.D Rs.@ **2.00%**	Period ofcompletion
1	The work of construction of Roads, drains, Pathways & RWH pits works at Janatha Colony, Doddakannelli, AECS layout-Kudlu & Singasandra Reservoir & Pump house Premises.	**Rs.84.72/- Lakh**(Excluding GST)	**Rs. 1,69,500/-**	6Months

5. Thelastdateforsubmissionofcompletedtenderdocumentsis**18.09.2024**up to **16:00 hrs.**
Thebidswillbeopenedon**20.09.2024at12.00P.M**.Ifthebid-openingdayremainsasapublicholiday,tenderswill beopened onthe nextworking dayat theoriginal stipulatedtime.

6. EMD can be paid through OTC, NEFT, and DEBIT CARD & CREDIT CARD throughE –Procurement only.The value of the Bid Security / EMD is as mentioned in the table above incolumn no 4.

7. Bidders can access tender documents from the website and upload the required details; thoseare mentioned in different sections in the bid document into an electronic tender box on thewebsite. Scanned documents that are required to be furnished as per Section 2, 3 & 4 of the biddocument shall be submitted through e- procurement in **PDF** format for clear vision.

8. The cost of the tender document once paid will not be refunded.

9. GSTshallbepaidseparatelyasper prevailingratesatthetimeofaward oftender.

10. The successful bidder would be required to give a performance **bank guarantee of 5%** ofthecontractamountwithjurisdictionatBangaloreasspecified,towardsguaranteeforcompletion of work within the stipulated period.

11. Applications / requisitions from joint venture Firms are not acceptable.

12. Bangalore Water Supply and Sewerage Board reserve the right to cancel or annul the entireor part of this process of invitation at any time without assigning any reason.

13.For any additional information regarding the above tender, the firms who are interested toquote,maycontacttheofficeofthe undersigned at the office address given below on allworkingdays during office hours 10.30hours to 17.00 hours.

The Executive Engineer

PROJECT-3 DIVISION,
Kapila Bhavan, 11th main, 35th cross,
4TH T BLOCK, JAYANAGAR, 560041

(Or)

VisitWebsite:www.eproc.karnataka.gov.in

13. Listofdocumentstosupportqualificationofbidderistobeuploadedtothee-procurementwebsite.**www. eproc.karnataka.gov.in**

14. Biddersshall submitoffers that complywith the requirementsof thebid document.

The Executive Engineer
PROJECT-3 DIVISION,
Kapila Bhavan, 11th main, 35th cross,
4TH T BLOCK, JAYANAGAR, 560041

SECTION2:INSTRUCTIONSTOTENDERER

S(ITT)TABLEOFCLAUSES

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F. AWARDOFCONTRACT

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24. Notificationofawardandsigningofagreement
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A. General

1. ScopeofTender

1.1 The**ExecutiveEngineer(Project-3)Division**(ReferredtoasEmployerinthesedocuments)invitestendersfollowingTwocover e-procurement procedure, from eligibletenderers,for the construction of works (as defined in these documents and referred to as"thework")detailedintheTablegivenintheInvitation forTenders(IFT).

2. EligibleTenderers

2.1 Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practicesissued by the Government of Karnataka

2.2 TendersfromJointventuresarenotacceptable.

3. QualificationoftheTenderer:

3.1 All tenderers shall provide the requested information accurately and in sufficient detail inSection 3: Qualification information.

3.2 To qualify for award of this contract, each tenderer in its name should have in the last fiveyears i.e. **2019-2020 to 2023-2024)**

(a) Contractors should have Civil Contractor registration in KPWD of state Government Organization, public sector under takings, other state Governments and the documentary evidence towards the same shall be furnished.

(b) Achievedinat least two financial years an average annual financial turnover (in all classesof civil Engineering construction works only) of **Rs. 99.97/- Lakh**

(c) Satisfactorily completed as prime contractor, in any one year at least one similar work ofconstruction of Building of value not less than **Rs. 50.00/- Lakh**

(d) Executedinanyoneyear,thefollowingminimumquantities ofwork:

- Excavation - 923 cum
- Concrete (PCC &RCC) - 342 cum
- Steel work - 12.8 MT
- Load Bearing Wall with Solid Concrete Blocks- 212 Sqm
- Cement Plaster- 511 Sqm.
- Wall Painting- 511 Sqm.

3.2.1The tenderer should visit the proposed site with the Assistant Executive Engineer and uploadthe site visit letter. The site visit letter is compulsory and mandatory & failing to submit withthese norms that it will be disqualified.

3.3 EachTenderershouldfurtherdemonstrate:

(a) DELETED

(b) Liquid assets and/or availability of credit facilities of not less than **Rs 30.00/-Lakh** (Creditlines/letterofcredit/certificatesfromNationalised/Scheduledbanksin India formeetingthefundrequirementetc.,

3.4 To qualify for a package of contracts made up of this and other contracts for which tendersare invited in this IFT, the Tenderer must demonstrate having experience and resources tomeet the aggregate of the qualifying criteria for the individual contracts.

3.5 Sub- contractors' experience and resources shall not be taken into account in determining theTender's compliance with the qualifying criteria except to the extent stated in 3.2 (d) and (e)above.

3.6 Tenderers who meet the above specified minimum qualifying criteria, will only be qualified,if their available tender capacity is more than the total tender value. The available tendercapacity will be calculated as under:

Assessed available tendercapacity = (A*N*2.5 - B) >99.97/- Lakh

Where,

A = Maximum value of civil engineering works executed in any one year during the last fiveyears (updated to 2023-24 price level @ 10%) taking into account the complete as well asworks in progress.
N = Number of years prescribed for completion of the works for which Tenders are Invited.B=Value,at2023-24pricelevel,ofexistingcommitmentsandon-goingworkstobeCompleted during the next **1 year** (period of completion of the works for which Tendersareinvited)[1*]

Note:Thestatementsshowingthevalueofexistingcommitmentsandongoingworksas well as the stipulated period of completion remaining for each of the works listedshould be countersigned by the Employer in charge, not below the rank of an ExecutiveEngineerorequivalent.

3.7 Even though the Tenderers meet the above criteria, they are subject to be disqualified if theyhave:

- Mademisleadingorfalserepresentationsintheforms,statementsandattachments submittedin proof of the qualification requirements; and/or
- Recordofpoorperformancesuchasabandoningtheworks,notproperlycompleting thecontract,inordinatedelaysincompletion,litigationhistory,orfinancialfailuresetc.;and/or
- participatedinthepreviousTenderforthesameworkandhadquotedunreasonablyhightender prices and could not furnish rational justification.

1

B. Tenderdocuments

4. ContentofTenderdocuments

4.1 The set of tender documents shall have all the Sections given in Page 2:

4.2 Boththesetsshouldbecompletedandreturnedwiththetender.

5. AmendmentofTenderdocuments

5.1 Beforethedeadlineforsubmissionoftenders,theEmployermaymodifytheten derdocuments by issuing addenda.

5.2 Any addendum thus issued shall be part of the tender documents and shall be communicatedin writing or by cable to all the purchasers of the tender documents.

5.3 To give prospective tenderers reasonable time in which to take an addendum into account inpreparingtheir tenders, the Employer shall extend as necessary the deadline for submissionoftenders, in accordance withSub-Clause 12.2 below.

C. PreparationofTenders

6. DocumentscomprisingtheTender

6.1 Thetendersubmittedbye-procurementbytheTenderershallcontainthedocumentasfollowing:

(a) TheformofTender(IntheformatindicatedinSection4);

(b) Scanned copy of Earnest Money Deposit;

(c) Scanned copies of Qualification Information as per formats given in Section 3; and any othermaterialsrequired to be completed and submitted by tenderers in accordance with theseinstructions. **The documents listed under Sections 3, 4, 6 and 9 shall be filled in withoutexception.PHOTOCOPIES OFTHEDOCUMENTS SHOULD NOTBEARISED.**

6.1.2Rates for the bill of quantities (section 9) shall be entered at the provision made in thee-procurement website portal.

6.2 TenderersubmittingtenderstogetherwithothercontractsstatedintheIFTtof ormapackagewill so indicate in the tender together with any discounts offered for the award of more thanone contract.

7. Tenderprices

7.1 Thecontractshallbeforthewholeworkasdescribedin Sub-Clause1.1basedonthepricedBillofQuantities submitted bytheTenderer.

7.2 TheTenderershall fill in rates in figures for all Items of the Works described in the Bill ofQuantities. The system will automatically convert the unit rates mentioned in figures to words andalsocalculatetheamountofthatitemaswellasthetotalTenderValue.**Itemsfor whichnorate**

orpriceisenteredbytheTendererwillnotbepaidforbytheEmployerwhenexecutedandshallbe deemed covered by the otherrates and prices in the bill of Quantities.

7.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any othercause,shallbeincludedintherates,pricesandtotalTenderPricesubmittedby theTenderer.

7.4 TheratesandpricesquotedbytheTenderershallbefixedforthedurationoftheContractandshall not be subject to adjustment on any account.

8. Tendervalidity

8.1 Tenders shall remain valid for a period not less than ninety days after the deadline date for tendersubmission specified in Clause 12. A tender valid for a shorter period shall be rejected by theEmployer as non-responsive.

8.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may requestthat the Tenderers may extend the period of validity for a specified additional period. The requestand the tenderers' responses shall be made in writing or by cable or e-mail. A tenderer may refusethe request without forfeiting his earnest money deposit. A Tenderer agreeing to the request willnot be required or permitted to modify his tender, but will be required to extend the validity of hisearnestmoneydepositfor a period of the extension, and in compliance with Clause 9 in allrespects.

9. Earnest money deposit

9.1 Earnestmoneydepositshallbepaidthroughe-procurementportalonlyusinganyofthefollowingfour modes.

i. Credit Card (online payment)

ii. Direct debit using internet banking (online Payment)

iii. RemittanceattheBankCounter-challan(offlinePayment)

iv. NEFT.

9.2 Instruments having fixed validity issued as earnest money deposit for the tender shall be valid for45days beyond the validity of the tender.

9.3 Any tender not accompanied by an acceptable earnest money deposit and not secured as indicatedin Sub-Clauses 9.1 and 9.2 above shall be rejected by the Employer as non-responsive.

9.4 The earnest money deposit of unsuccessful Tenderers will be returned within 30 days of the end ofthe tender validity period specified in Sub-Clause 8.1.

9.5 The earnest money deposit of the successful Tenderer will be discharged when the Tenderer hassignedtheAgreement andfurnished the

requiredPerformance Security.

9.6 The earnest money deposit may be forfeited:

(a) IftheTendererwithdrawstheTenderaftertenderopeningduringtheperiodoftender validity;

(b) IftheTendererdoesnotacceptthecorrectionoftheTenderPrice,pursuanttoClause19;or

(c) InthecaseofasuccessfulTenderer,iftheTendererfailswithinthespecifiedtimelimitto

(i) Sign theAgreement; or

(ii) Furnish the required Security deposit

10. FormatandsigningofTender

10.1 The completed bid comprising of documents indicated in ITT 6, should be uploaded by accessing**Karnataka Government** website**www.eproc.karnataka.gov.in**through "**e-procurement**" alongwith scanned copies of requisite certificates those are mentioned in different sections in the biddocument and scanned copy of Bid Security/EMD in case it is provided in the form OTC, NEFT,Debit Card & Credit Card.

10.2 All the documents should be uploaded in e-procurement portal website. Tenderer should take aprint out of the Form of Tender in section 4 of tender document on company letterhead and shouldsign,stamp and upload the same to the tender. Authenticity of the signing authority shall befurnished.Withthis, itis takenthatthe tendererhassigned &submitted thetender.

10.3 The tender shall contain no alterations or additions, except those to comply with instructionsissuedbytheEmployer,orasnecessarytocorrecterrorsmadebytheTenderer,inwhichcasesuchcorrectionsshall beinitiated bythe personsigning theTender.

D.SubmissionofTenders

11. Up-loadingandSubmissionofTenders

11.1 TheTendersshouldbeuploadedonlythroughe-procurementwebsite.Tendershouldcontain

A. Technicaltenderconsistingoffollowing:

a. All the Documents with required details in prescribed format: those are mentioned in differentsections in the Tender. Form of Tender, etc., shall be downloaded, filled with required details,signed,scanned&uploadedtothee-Procurementportal(**www.eproc.karnataka.gov.in**).

b. The above documents along with notarized copies of documentary evidences as indicated inSection-II ITT, Section – II Qualification information & Section IV Forms of Tender shall bescanned and uploaded to the website compulsorily, failing which tender will be rejected in viewof incomplete tender document and

B. FinancialTenderconsistingofBillofQuantities:

All rates for the items in the schedule shall be postedin the work template provided in thetender document. Rates shall be entered in figures only and rates in words will be automaticallygenerated.

11.2 Deleted

11.3 BIDreferenceNumberwillbeautomaticallygeneratedbytheserver.

11.4 Deleted

12. DeadlineforsubmissionoftheTenders

12.1 Deleted

12.2 The Employer may extend the deadline for submission of tenders by issuing an amendment inaccordancewithClause5,inwhichcaseall rights and obligations of the Employer and theTenderersperviouslysubjectto theoriginaldeadlinewill thenbesubjectto thenewdeadline.

13. LateTenders

13.1 Thesoftwareofe-procurementwebsitesystemwillnotallowtheTenderertouploadthedocuments after expiration of the stipulated date & time of bid submission. The Tender shall refertotheserver time, which will be displayed in the e-procurement portal. BWSSB will not beresponsible for non-receipt of bids on the stipulated date & time prescribed in clause 12, due toInternetproblems,improperuploading or any other related problems. In case of connectivityproblems,Tendersmaycontactthe help desk of the e-procurement portal service provider andmayalso draw the attentionof tender inviting authority.

14. ModificationsandWithdrawalofTenders

14.1 Tenderersmaymodifyandwithdrawtheirtenders'multipletimes,untilthedeadlineforsubmission of tenders by operating the relevant provision made in e-procurement. If the tendererwithdraws the tender before the deadline for submission of tenders and later if he is interested tosubmitthetenderonceagain,maydosowithinthestipulated date&timeasmentionedin Clause 12.Inthiscasewithinthestipulateddateandtime,the tenderer can once again submit therequisitiontotheofficerinvitingtendersforaccesstowithdrawntenderdocuments forresubmission. For this, the tenderer need not make any additional payment towards the cost of thetenderdocument.Communicationofmodification/withdrawalbyothermeans willnotbeaccepted.

14.2 Deleted

14.3 No tender may be modified after the deadline for submission of tenders.

14.4 Withdrawal or modification of a tender between the deadline for submission of tenders and theexpiration of the original period of tender validity specified in Clause 8.1 above or as extendedpursuant to Clause 8.2 may result in the forfeiture of the earnest money deposit pursuant to clause9.

14.5 Tendersmay only offer discounts for individual items by simply modifying the quoted unit pricein the bill of quantities. Also, Tenderer may enter their overall discount, at specified location in theBillofQuantitiesonly,bysubmittingtendermodificationsinaccordancewiththisclause.Communication of discount by other means will not be accepted.

E.Tenderopeningandevaluation

15. TenderOpening:

15.1 TheEmployerwillopentheTechnicaldetailsofalltheTendersreceived(exceptthosewithdrawn), including modifications made pursuant to Clause 14, in the presence of the Tenderersortheirrepresentativeswho choose to attend at the Employer’s office mentioned in the earlierPara at 12.00 P.M hours on the date and the place specified. In the event of the specified date ofTender opening being declared a holiday for the Employer, the Tenders will be opened at theappointedtime and location on thenext working day.

15.2 WITHDRAWAL proposal submitted pursuant to clause 14 shall be read out first and their bidsshall not be opened

15.3 The Tenderers names, the presence or absence of earnest money deposit (amount, format andvalidity), the submission of qualification information and such other information as the Employermay consider appropriate will be announced by the Employer at the opening.

15.4 The Employer shall prepare minutes of the Tender opening, including the information disclosed tothose present in accordance with Sub-Clause 15.3.

15.5.5 The Price Tenders of all the Tenderers including modifications for financial tenders cannot beopenedasthisisprogrammedtoopenlaterafterevaluationoftheTechnicaldetail sof theparticipatingTenderers

15.6The Employer will evaluate and determine whether each tender (a) meets the eligibility criteriadefinedinITTClause2; (b)isaccompaniedbytherequiredearnestmoneydepositas perstipulations in ITT Clause and (c) meets the minimum qualification criteria stipulated in ITTClause3.The Employerwill draw out alist of qualifiedTenderers.

16. OpeningofsecondcoverofqualifiedTenderersandevaluation:

16.1 The Employer will inform all the Qualified Tenderers the time, date and venue fixed for theopening of the price Tenders.The Employer will open the price tender of Qualified Tenderers atthe appointed time and date in the presence of the Tenders or their representatives who choose toattend. In the event of the specified date of Price tender opening being declared a holiday for theEmployer, the price tenders will be opened at the appointed time and location on the next workingday.

16.2. Deleted.

16.3 The Tenderers names, the Tender prices, the total amount of each Tender, any discount, tendermodifications and withdrawals, and such other details as the Employer may consider appropriate,willbeannouncedbytheEmployerattheopening.NoTendershallbere jectedatTenderopening.

16.4 The Employer shall prepare minutes of the Price Tender opening, including the informationdisclosed tothosepresentinaccordancewithSub-Clause16.3.

17. Processtobeconfidential

17.1 Information relating to the examination, clarification, evaluation, and comparison of Tenders andrecommendations for the award of a contract

shall not be disclosed to Tenderers or any otherpersons not officially concerned with such process until the award to the successful Tenderer hasbeen announced. Any effort by a Tenderer to influence the Employer's processing of Tenders orawarddecisions mayresult inthe rejection ofhisTender.

18. ClarificationofTenders

18.1 To assist in the examination, evaluation, and comparison of Tenders, the Employer may, at hisdiscretion, ask any Tenderer for clarification of his Tender, including breakdowns of unit rates.The request for clarification and the response shall be in writing or by cable, but no change in thepriceorsubstanceoftheTender shall be sought, offered, or permitted except as required toconfirm the correction of arithmetic errors discovered by the Employer in the evaluation of theTendersin accordance with Clause 20.

18.2 Subject to sub-clause 18.1, no Tenderer shall contact the Employer on any matter relating to itsTender from the time of the Tender opening to the time the contract is awarded. If the Tendererwishesto bringadditional informationto thenotice ofthe Employer, itshould doso inwriting.

18.3 AnyeffortbytheTenderertoinfluencetheEmployerintheEmployer'sTenderevaluation,Tendercomparisonorcontractawarddecisionsmayresultintherejection oftheTenderers'Tender.

19. ExaminationofTendersanddeterminationofresponsiveness

19.1 Prior to the detailed evaluation of Tenders, the Employer will determine whether each Tender (a)has been properly signed; and (b) is substantially responsive to the requirements of the Tenderdocuments.

19.2 AsubstantiallyresponsiveTenderisonewhichconformstoalltheterms,conditions, andspecificationsoftheTender documents, without material deviation or reservation. A materialdeviation or reservation is one (a) which affects in any substantial way the scope, quality, orperformance of the Works; (b) which limits in any substantial way, inconsistent with the Tenderdocuments, the Employer's rights or the Tenderers obligations under the Contract; or (c) whoserectificationwouldaffectunfairlythecompetitivepositionofotherTenderer spresentingsubstantiallyresponsiveTenders.

19.3 If a Tender is not substantially responsive, it will be rejected by the Employer, and may notsubsequently be made responsive by correction or withdrawal of the nonconforming deviation orreservation.

20. Correctionoferrors

20.1 (a) Once the Tenderer key in the rates in figures, in the Bill of quantities provided, the systemwill automatically calculate the amount of that item as well as the total Bid value.

20.2 Deleted

21. EvaluationandcomparisonofTenders

21.1 TheEmployerwillevaluateandcompareonlythetendersdeterminedtobesubstantiallyresponsive in accordance with clause 19.

21.2 Deleted

21.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer.Variations,deviations,andalternativeoffersandotherfactors,whichareinexcessoftherequirements of the tender documents or otherwise result in unsolicited benefits for the employer,shall not be taken into account in tender evaluation.

F.AwardofContract

22. Awardcriteria

22.1 SubjecttoClause 24, the Employer will award the Contract to the Tenderer whose Tender hasbeen determined to be substantially responsive to the Tender documents and who has offered thelowest evaluated Tender Price, provided that such Tenderer has been determined to be (a) eligiblein accordance with the provisions of Clause 2, and (b) qualified in accordance with the provisionsof Clause 3.

23. Employer'srighttoacceptanyTenderandtorejectanyorallTenders

23.1 Notwithstanding Clause 22, the Employer reserves the right to accept or reject any Tender, and tocancelthe Tender process and reject all Tenders, at any time prior to the award of Contract,without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation toinformtheaffectedTendererorTenderersofthegroundsfortheEmployer'sactio n.

24. Notificationofawardand signingofAgreement

24.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer priorto expiration of the Tender validity period by cable, telex or facsimile confirmed by registeredletter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance")will state the sum that the Employer will pay the Contractor in consideration of the execution,completion,andmaintenanceoftheWorksbytheContractorasprescrib edbytheContract(hereinafter and in the Contract called the "Contract Price").

24.2 ThenotificationofawardwillconstitutetheformationoftheContract,subjectonlyto thefurnishing of a performance security in accordance with the provisions of Clause 25.

24.3 TheAgreementwillincorporateallagreementsbetweentheEmployerandthesucc essfulTenderer. It will be kept ready for signature of the successful Tenderer in the office of Employerwithin 30 days following the notification of award along with the Letter of Acceptance. Within 20daysofreceipt,thesuccessfulTendererwillsigntheAgreementanddeliverittoth eEmployer.

24.4 UponthefurnishingbythesuccessfulTendereroftheSecuritydeposit,theEmploye rwillpromptlynotifytheotherTenderers thattheirTendershavebeen unsuccessful.

25. Security deposit

25.1 Within 20 days of receipt of the Letter of Acceptance, the successful Tenderer shall deliver to theEmployer a Security deposit in any of the forms given below for an amount equivalent to 5% ofthe Contract price:

- Cash or

- Banker’scheque/Demanddraft/ PayOrderinfavourofChairman,BWSSBpayableatBangalore or

- Abank guarantee in the form given in Section 10;

25.2

Thesecuritydepositisprovidedbythesuccessful Tenderer in the form of a Bank Guarantee, it shall be issued either by a Nationalized/Scheduled bank.

25.3 The security deposit if furnished in cash or demand draft can, if requested, be converted to interestbearingsecurities at the cost of thecontractor.

25.4 Failureofthesuccessful Tenderer to comply with the requirements of Sub-Clause 25.1 shallconstitute sufficient grounds for cancellation of the award and forfeiture of the earnest moneydeposit.

26. Corrupt orFraudulent practices

26.1 The GoK requires that the Tenderers/Suppliers/Contractors observe the highest standard of ethicsduringtheprocurement andexecution ofsuchcontracts. Inpursuanceof thispolicy, GoK:

(a) will reject a proposal for award if it determines that the Tenderer recommended for awardhas engaged in corrupt or fraudulent practices in competing for the contract in question;

(b) willdeclareafirmineligible,eitherindefinitelyorforastated period of time, to beawarded a GOK contract if it at any time determines that the firm has engaged in corrupt orfraudulentpractices in competing for,or in executing, aGoK contract.

26.2 Furthermore, Tenderers shall be aware of the provision stated in sub-clause 43.2 of the Conditionsof Contract.

The Executive Engineer
PROJECT-3 DIVISION,
Kapila Bhavan, 11th main, 35th cross,
4TH T BLOCK, JAYANAGAR, 560041

SECTION 3: Qualification Information

TheFollowingformistobedownloaded,particularsaretobefilled,scannedanduploadedbytheBidder,to**website: www.eproc.karnataka.gov.in**alongwith theBid.

Note: The detailed procedure for downloading/uploading the documents will be available in Help Wizard,Vendormanual& FAQof theabove-mentioned website.

The information to be filled in by the Tenderer here under will be used for purposes of computing TendercapacityasprovidedforinClause3oftheInstructions to Tenderers. This information will not beincorporated in the Contract.

1.1 ConstitutionorlegalstatusofTenderer[Attachcopy] (Attach Copy)Place of Registration _____

(Attach Copy)

Principal place of business: _____

1.2 Totalvalueofcivilengineeringconstruction works executed and payments received in the last five years (in Rs. Lakh)

2019–20_____

2020–21_____

2021-22_____

2022-23_____

2023-24_____

1.3 WorkperformedasPrimeContractor(inthesamename)onworksofsimilarnatureovertheFiveyears specified in 1.2 above.

Project Name	Name of the Employer	Description of Work	Contract Number	Value of Contract Rs. In Lakh	Date of issue of Work Order	Specified Period of Completion	Actual Date of Completion	Remarks explaining reasons for delay in completion of work
1	2	3	4	5	6	7	8	9

1.4 Quantitiesofworkexecutedasprimecontractor(inthesamename)duringthelastfiveyearsspecified in 1.2 above:

[2]AttachCertificatefromCharteredAccountant

Year	Name ofWork	Name ofEmployer	Quantity of work performed (cum)			Remarks(Indicatedcontractreference)
			Earthworks	Cementconcrete	Solid Blocks	
2019–20						
2020–21						
2021-22						
2022-23						
2023-24						

1.5.

InformationonworksforwhichTendershavebeensubmittedandworkswhicharey ettobecompletedas on thedate of thisTender.

(A) Existing commitments and on-going works:

Description of work	Place&State	ContractNo. &Date	Name& AddressofEmployer	ValueofContract(Rs. Lakhs)	StipulatedperiodCompletion	Value ofWorksremainingto be complete(Rs. Lakh)	Anticipated Date ofCompletion
1	2	3	4	5	6	7	8

TheContractorshallenclose/

attachallthenecessarycertificatesdulyattestedbytheemployer.(B)Works forwhichTenders alreadysubmitted:

Description ofwork	Place&State	Name& AddressofEmployer	EstimatedValue ofWorks(Rs.	StipulatedDate periodof Completion	DateWhichdecisionisexpected	Remarks if any

			Lakhs)			
1	2	3	4	5	6	7

1.6 The following items of equipment are considered essential for successfully carrying out the works.Thetenderer should furnish allthe information listed below.

Item ofEquipment	Requirement	Owned and available stipulated date period ofcompletion when decision is expected				Remarks.
1	No.	Capacity	Owned	Number/ Capacity	Age/ Condition	

1.7 Reports on the financial standing of the tenderer, such as profit and loss statements and auditor'sreports for the last five years;

1.8 Qualificationandexperienceofthekeytechnicalandmanagementpersonnelinpermanentemployment with the tenderer and those that are proposed to be deployed on this contract, ifawarded.

1.9 Name, address, and telephone, telex, and fax numbers of the Tenderers' bankers who may providereferencesif contacted by the Employer.

1.10 Proposals for subcontracting components of works amounting to more than 20% of the contractprice (for each, the qualification and experience of the identified sub-contractor in the relevantfield should be attached).

BANKER'SCERTIFICATE

ThisistocertifythatM/s.....Is a reputed company with a good financialstanding.If the contract for this work, namely ..... (Name of thework) is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent ofRs. to meet the working capital requirements for executing the above contract.

Sd/-

Name of the Bank, Senior Bank

ManagerAddress:.....

1.11 Proposals for subcontracting components of works amounting to more than 20% of the contractprice.

Item of work	Value of Subcontract	IdentificationSub-contractor	Experience of similarwork

		(Name & address)	

1.12 InformationonlitigationsinwhichtheTenderersisinvolved:

Other Party (ies)	Employer	Details ofdispute	Amoun tinvolv ed	Remarks showingpresen t status

SECTION4:FORMOFTENDER,LETTEROFACCEPTANCE,NOTICETOPROCEEDWITHTHEWORKANDAGREEMENTFORM

FORMOFTENDER

[Tenderershalldownloadthispage,printontheletterhead,fillthegaps,putthesignature, scanthesheet&uploadtothewebsite.Failingwhichtenderwillbetreatedasnon-responsive]

DescriptionoftheWorks: "The work of Construction of Roads, drains, Security wall, Pathways & RWH pits at Singasandra, AECS Layout, Kudlu and Janatha Colony, Doddakannelli OHT, Reservoir and Pump house Premises".

TO,

TheExecutiveEngineer,
BWSSB
(Project-3)Division,
Grd Floor, 35th cross, 11th main,Jayanagar, Bangalore-41.

Gentlemen,

WeoffertoexecutetheWorksdescribedaboveinaccordancewiththeConditionsofContractaccompanyingthisTenderfortheContractpriceasmentionedintheBillofquantities-Section9.

ThisTenderandyourwrittenacceptance of it shall constitute a binding contract between us. We understand thatyouarenotboundtoacceptthelowestoranyTenderyoureceive.

Weundertakethat,incompetingfor(and,iftheawardismadetous,inexecuting)theabovecontract, wewillstrictlyobservethelawsagainstfraudand corruptioninforceinIndianamely"Prevention ofCorruptionAct1988".

WeherebyconfirmthatthisTendercomplieswiththeTendervalidityandEarnestmoneydepositrequiredbytheTendererdocuments.

Weattachherewithourcurrentincome-

taxclearancecertificate.Yoursfaithfully,

AuthorizeSignature:_____
Name&TitleofSignatory:_____
_____
NameofTenderer:_____
Address:_____

_____

LetterofAcceptance

To: _____

(Name andAddress of the Contractor)

Dear Sirs,

ThisistonotifyyouthatyourTenderdated _____ forexecutionofthe _____
_____
(nameofthecontractandidentificationnumber,asgivenintheinstructions to Tenderers) for the Contract Price ofRupees_____(_____ _____)(amountinworksandfigures), as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted byyourAgency.

You are hereby requested to furnish Security deposit, in the form detailed in Para 25.1 of ITT for anamount of Rs..... within 20 days of the receipt of this letter of acceptance valid up to 30daysfromthedateofexpiryofDefectsLiabilityPeriodi.e.upto... andsign the contract, failing
which action as stated in Para 25.4 of ITTwill be taken.

Yoursfaithfully,

Authorized Signature
NameandTitleofSignatory
NameoftheAgency.

`

.....

IssueofNotice toproceed withthework

(Letterhead of the Employer)

To
_____(name and address of the

Contractor)Dear Sirs:

Pursuant to your furnishing the requisite security deposit as stipulated in ITT Clause 25.1 andsigningofthe contract agreement for the constructionof ----------(Name of the Contract) aTender Price of Rs....., you are hereby instructed to proceed with the execution of the saidworks in accordance with the contract documents.

Yoursfaithfully,
(Signature, name and title of signatory authorized to sign on behalf of Employer)

AgreementForm

Agreement

This agreement, made the _____day of _____20_____, between_____ [name and address of Employer] (hereinafter called "the Employer") of the one part and

_____

_____[nameand address of contractor] (hereinafter called "theContractor") of the other part.

Whereas the Employer is desirous that the Contractor execute _____

_____

[nameandidentificationnumberofContract] (hereinaftercalled"theWorks")andtheEmployerhasacceptedthe Tender by the Contractor for the execution and completion of such Works and the remedying of anydefects therein at a contract price of Rupees.....

NOWTHISAGREEMENTWITNESSETH as follows:

1. InthisAgreement,wordsandexpressionshallhavethesamemeaningsasarerespectivelyassigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed toform and be read and construed as part of thisAgreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinaftermentioned, the Contractor hereby covenants with the Employer to execute and complete the Worksand remedy any defects therein in conformity in all aspects with the provisions of the Contract.

3. TheEmployerherebycovenantstopay the Contractor in consideration of the execution andcompletion of the Works and the remedying the defects wherein the Contract Price or such other sumasmaybecomepayableundertheprovisionsoftheContractatthetimesandinthe mannerprescribed by the Contract.

4. The following documents shall be deemed to form and be read and construed as part of thisAgreement, viz:

i) Letter ofAcceptance;
ii) Notice to proceed with the works;
iii) Contractor'sTender;
iv) Contract Data;
v) Conditions of contract (including Special Conditions of Contract);
vi) Specifications;
vii) Drawings;
viii) Bill of Quantities; and
ix) Any other document listed in the Contract Data as forming part of the

contract.

Whereas, the parties now mutually agree to the following conditions of Contract.

5. JurisdictionofCourts/

Arbitration:TheSittingofarbitrationshallbeheldatBangaloreonlyandnowhere else.

6. Disputesofanykindarisingoutofthecontractshallberesolved within the jurisdiction ofBangalore city only and the parties agree and clearly understand that the courts/ tribunals situatedat Bangalore Metropolitan City have exclusive jurisdiction for the redressal of the disputes arisingout of the contract and at no other place.
7. The parties further agree and understand that the place or places of issue of bank guarantee otherthan Bangalore will have no jurisdiction to resolve disputes of any kind relating to enforcement ofthe bank guarantees submitted by the contractor at Bangalore for the execution of the contract atBangalore.
8. Thecontractorshallcomplywithallthelegalrequirements in the matter of employment ofworkmen and provide all safety gadgets to the workmen while working in the hazards place ofconditions during the execution of the contract.
9. Contractorshall be fully responsible in the event of death of employee/ workman during theexecution of the work and liable to pay adequate compensation to the dependants of employee/workmanas per law.
10. On his/ their failure, if the Board is made to pay compensation the same shall be recovered by theBoard from the contractor out of the amounts due to the contractor or by appropriate legal action.

InwitnesswhereofthepartiestheretohavecausedthisAgreementtobeexecutedthedaya ndyearfirstbefore written.

The Common Seal of _____
washereuntoaffixedin thepresenceof:

Signed, Sealed and Delivered by the said _____
in the presence of:

Binding Signature of Employer _____

BindingSignatureofContractor_____

SECTION5:CONDITIONSOFCONTRACT

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F. Special Conditions of Contract

Conditions of Contract

A. General

1. Definitions

1.1

TermswhicharedefinedintheContractDataarenotalsodefinedintheConditionsof Contract but keep their defined meanings. Bold letters are used to identify defined terms.

BillofQuantitiesmeansthepricedandcompletedBillofQuantitiesformingpartoftheTender.

CompensationeventsarethosedefinedinClause38hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Employer inaccordance with Sub Clause 38.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete andmaintaintheWorks.It consistsofthedocuments listedinClause2.3 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Tender to carry out the Works has beenacceptedby the Employer.

The **Contractor's Tender** is the completed Tender document submitted by the Contractor to theEmployer.

The **Contract price** is the price stated in the Letter of Acceptance and thereafter as adjusted inaccordance with the provisions of the Contract.

Days are calendar days; **months** are calendar months.

A**Defect**isanypartoftheWorksnotcompletedinaccordancewiththeContract.

The **Defects liability period** is the period named in the Contract Data and calculated from theCompletion Date.

The**Employer**isthepartywhowillemploytheContractortocarryouttheWorks.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to constructtheWorks.

The **Initial Contract price** is the Contract Price listed in the Employer's Letter ofAcceptance.

The **Intended Completion Date** is the date on which it is intended that the

Contractor shallcompletetheWorks.TheIntendedCompletionDateisspecifiedintheContract Data.TheIntended Completion Date may be revised only by the Employer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in theWorks.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic orchemical or biological function.

The **Site** is the area defined as such in the Contract Data.

Specification means the Specification of the Works included in the Contract and any modificationoraddition made or approved by theEmployer.

The**StartDate**isgivenintheContractData.ItisthedatewhentheContractorshall commenceexecution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A**Subcontractor**isapersonorcorporatebodywhohasaContractwiththeContractor tocarryout a part of the work in the Contract which includes work on the Site.

A**Variation**isaninstructiongivenbytheEmployerwhichvariestheWorks.

The**Works**arewhattheContractrequirestheContractortoconstruct,install,andturnovertotheEmployer,as defined in the Contract Data.

2. Interpretation

2.1 Ininterpretingthese Conditions of Contract, singular also means plural, male also means femaleor neuter, and the other way around. Headings have no significance. Words have their normalmeaningunderthelanguageoftheContractunlessspecificallydefined.The Employerwillprovide instructions clarifying queries about the Conditions of Contract.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement
(2) Letter ofAcceptance, notice to proceed with the works
(3) Contractor’sTender
(4) Contract Data
(5) Conditions of Contract
(6) Specifications
(7) Drawings
(8) Bill of quantities and
(9) Any other document listed in the Contract Data as forming part of the Contract.

3. Law governing contract

3.1 The law governing the Contract is the Laws of India supplanted by the Karnataka LocalActs.

4. Employer's decisions

4.1 Except where otherwise specifically stated, the Employer will decide contractual matters betweentheEmployer and the Contractor.

5. Delegation

5.1 The Employer may delegate any of his duties and responsibilities to other people after notifyingtheContractor and maycancel any delegationafter

notifying theContractor.

6. Communications

6.1 Communicationsbetweenpartieswhich are referred to in the conditions are effective only wheninwriting.Anotice shallbe effective only whenit is delivered (interms of Indian ContractAct).

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Employer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer.

9. Personnel

9.1 The Contractor shall employ the technical personnel (of number and qualifications) as may be stipulated by GOK from time to time during the execution of the work. The technical staff so employed shall be available at site as may be stipulated by the Employer.

9.2 If the Employer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer's and Contractor's risks

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Employer's risks

11.1 The Employer is responsible for the excepted risks which are

(a) in so far as rebellion, riot commotion or disorder or

(b) a cause due solely to the design of the Works, other than the Contractor's design.

(c) Any Operation of the forces of nature (in so far as it occurs on the site) which an experienced contractor:

i. Could not have reasonably foreseen; or
ii. Could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures:
a. Prevent loss or damage to physical property from occurring by taking appropriate measures or
b. Insure against such loss or damage

12. Contractor's risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the

Contractor.

13. Queries about the Contract Data

13.1 The Employer will clarify queries on the Contract Data.

14. ContractortoconstructtheWorks

14.1 TheContractorshallconstructtheWorksinaccordancewiththeSpecificationandDrawings.

15. TheWorkstobecompletedbytheIntendedCompletionDate

15.1 The Contractor may commence execution of the Works on the Start Date and complete them bythe Intended Completion Date.

16. Safety

16.1 The Contractor shall be responsible for the safety of all activities on the Site.

17. Discoveries

17.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Siteis the property of the Employer. The Contractor is to notify the Employer of such discoveries andcarry out the Employer's instructions for dealing with them.

18. Possession of the Site

18.1TheEmployershallgivepossessionofallpartsoftheSitetotheContractor.Ifpossessionofapart is not given by the date stated in the Contract Data the Employer is deemed to have delayedthe start of the relevant activities and this will be a Compensation Event.

19. Access to the Site

19.1The Contractor shall allow the Employer and any person authorized by the Employer access to theSite, to any place where work in connection with the Contract is being carried out or is intended tobecarriedoutandtoanyplacewherematerialsorplantarebeingmanufactured/ fabricated/assembled for the works.

20. Instructions.

20.1The Contractor shall carry out all instructions of the Employer which comply with the applicablelaws where the Site is located.

B. TimeControl

21. Program.

21.1 Withinthe time stated in the Contract Data the Contractor shall submit to the Employer forapprovalaProgramshowingthe general methods, arrangement, order, and timing for all theactivitiesin theWorks.

21.2.TheEmployer’sapprovaloftheProgramshallnotaltertheContractor’sobligations. TheContractor may revise the Program and submit it to the Employer again

at any time. A revisedProgramisto showthe effectofVariationsandCompensation Events.

22. Extension of the Intended Completion Date

22.1 The Employer shall extend the Intended Completion Date if a Compensation Event occurs or aVariation is issued which makes it impossible for Completion to be achieved by the IntendedCompletion Date.

22.2 The Employer shall decide whether and by how much to extend the Intended Completion Datewithin21daysoftheContractoraskingtheEmployerforadecisionupontheeffectofaCompensationEventorVariationandsubmitting fullsupportinginformation.

23. DelaysorderedbytheEmployer

23.1The Employer may instruct the Contractor to delay the start or progress of any activity within theWorks.

24. Management meetings.

24.1 The Employer may require the Contractor to attend a management meeting. The business of amanagement meeting shall be to review the progress achieved and the plans for remaining work.

24.2 The responsibility of the parties for actions to be taken is to be decided by the Employer either atthe management meeting or after the management meeting and stated in writing to be distributedto all who attended the meeting.

C.QualityControl

25. Identifying defects:

25.1The Employer shall check the Contractor's work and notify the Contractor of any Defects that arefound. Such checking shall not affect the Contractor's responsibilities. The Employer may instructthe Contractor to search for a Defect and to uncover and test any work that the Employer considersmay have a Defect.

26. Tests

26.1TheEmployerinstructstheContractortocarryoutatestnotspecifiedintheSpecification tocheck whether any work has a Defect and the test shows that it does, the Contractor shall pay forthe test and any samples.If there is no Defect the test shall be a Compensation Event.

27. Correctionofdefects

27.1 The Employer shall give notice to the Contractor of any Defects before the end of the DefectsLiability Period, which begins at Completion and is defined in the Contract Data. The DefectsLiability Period shall be extended for a long as Defects remain to be corrected.

27.2 Every time notice of a Defect is given, the Contractor shall correct the

notified Defect within thelengthof time specified by the Employer’s notice.

28. Uncorrecteddefects

28.1 If the Contractor has not corrected a Defect within the time specified in the Employer’s notice, theEmployer will assess the cost of having the Defect corrected, and the Contractor will pay thisamount.

D. CostControl

29. Bill of Quantities (BOQ)

29.1 The BOQ shall contain items for the construction, installation, testing, and commissioning work tobedone by the Contractor.

29.2 TheBOQisusedtocalculatetheContractPrice.TheContractorispaidforthequantityofthework done at the rate in the BOQ for each item.

30. Variations

30.1 TheEmployershallhavepowertoordertheContractortodoanyorallofthefollowing asconsidered necessary or advisable during the progress of the work by him.

(a) Increase or decrease of any item of work included in the Bill of Quantities (BOQ):

(b) Omit any item of work:

(c) Change the character or quality or kind of any item of work

(d) Change the levels, lines, positions and dimensions of any part of the work:

(e) Execute additional items of work of any kind necessary for the completion of the works;and

(f) Change in any specified sequence, methods or timing of construction of any part of thework.

30.2 The Contractor shall be bound to carry out the work in accordance with any instructions in thisconnection, which may be given to him in writing by the Employer and such alteration shall notvitiate or invalidate the contract**.**

30.3 Variations shall not be made by the Contractor without an order in writing by the Employer,provided that no order in writing shall be required for increase or decrease in the quantity of anitem appearing in the BOQ so long as the work executed conforms to the approved drawing.

30.4 The Contractor shall promptly request in writing the Employer to confirm verbal orders and if nosuch confirmation is received within 15 days of request, it shall be deemed to be an order inwritingby the Employer.

31. PaymentsforVariations

31.1 Payment for increase in the quantities of an item in the BOQ up to 25% of that provided in the BillofQuantities shall be madeat the rates quoted bythe Contractor.

31.2 For quantities in excess of 125% of the tendered quantity of an items given in the BOQ theContractor shall be paid at the rate entered in or derived from in the Schedule of Rates (applicablefor the area of the work and current at the time of award of contract) plus or minus the overallpercentageof the original tendered rates over the current Schedule of Rates prevalent at the timeof award of contract.

31.3 If there is no rate for the additional, substituted or altered item of the work

in the BOQ, effortswouldbemadetoderivetheratesfromthosegivenintheBOQortheSchedule of Rates(Applicable for the area of the work and current at the time of award of contract) and if foundfeasiblethepaymentwouldbemadeatthederivedratesfortheitemplusormin ustheoverall

percentage of the original tendered rates over the current Schedule of Rat6es prevalent at the timeof award of contract.

31.4 Iftheratesforadditional,substitutedoralterеditemofworkcannotbedeterminedeit herasat
31.1 or 31.2 or 31.3 above, the Contractor shall be requested to submit his quotation for the itemssupported by analysis of the rate or rates claimed, within 7 days.

31.5 If the Contractor's quotation is determined unreasonable, the Employer may order the Variationand make a change to the Contract Price which shall be based on Employer's own forecast of theeffectsof theVariation onthe Contractor'scosts.

31.6 If the Employer decides that the urgency of varying the work would prevent a quotation beinggiven and considered without delaying the work, no quotation shall be given and the Variationshall be treated as a Compensation Event.

31.7 Under no circumstances the Contractor shall suspend the work on the plea of non-settlement ofrates for items falling under this Clause.

32. Submission of bills forpayment

32.1 The Contractor shall submit to the Employer monthly bills of the value of the work completed lessthecumulative amount paid previously.

32.2 The Employer shall check the Contractor's bill and determine the value of the work executedwhich shall comprise of (i) value of the quantities of the items in the BOQ completed and (ii)valuationofVariations andCompensation Events.

32.3 The Employer may exclude any item paid in a previous bill or reduce the proportion of any itempreviously paid in the light of later information.

33. Payments

33.1 Payments shall be adjusted for deductions for retention, other recoveries in terms of the contractand taxes, at source, as applicable under the law. The Employer shall pay the Contractor within 60days of submission of bill.

33.2 Items of the Works for which no rate or price has been entered in will not be paid for by theEmployer and shall be deemed covered by other rates and prices in the Contract.

34. Compensation events

34.1 The following are Compensation event unless they are caused by the Contractor:

(a).

TheEmployerdoesnotgiveaccesstoapartoftheSitebytheSitePossessionDatestatedin theContractData.

(b) TheEmployerordersadelayordoesnotissuedrawings,specificationsorinstructio

nsrequiredforexecutionofworksontime.

(c) TheEmployerinstructstheContractortouncoverortocarryoutadditionaltestsupo nworkwhichisthenfoundtohavenoDefects.

(d) TheEmployergivesaninstructionfordealingwithanunforeseencondition,c ausedbytheEmployer,oradditionalworkrequiredforsafetyorotherreasons.

(e) TheeffectontheContractorofanyoftheEmployer’sRisks.

(f) TheEmployerunreasonably,delaysissuingaCertificateofCompletion.

(g) OtherCompensationEventslistedintheContractDataormentionedintheContract.

34.2 If a Compensation Event would cause additional cost or would prevent the work being completedbefore the Intended Completion Date, the Contract Price shall be increased and/or the IntendedCompletion Date is extended. The Employer shall decide whether and by how much the ContractPrice shall be increased and whether and by how much the Intended Completion Date shall beextended.

34.3 AssoonasinformationdemonstratingtheeffectofeachCompensationeventuponth eContractor'sforecastcosthasbeenprovidedbytheContractor,itistobeassessedb ytheEmployer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast isdeemed unreasonable, the Employer shall adjust the Contract Price based on the Employer's ownforecast. The Employer will assume that the Contractor will react competently and promptly tothe event.

34.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interest isadversely affected by the Contractor not having given early warning or not having cooperated withtheEmployer.

35. Tax

35.1The rates quoted by the Contractor shall be deemed to be inclusive of the sales and other taxes thatthe Contractor will have to pay for the performance of this Contract. The Employer will performsuchduties inregard to thededuction ofsuch taxes atsource asper applicable law.

36. Liquidated damages

36.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in theContract Data for each day that the Completion Dates later than the Intended Completion Date.The total amount of liquidated damages shall not exceed the amount defined in the Contract Data.The Employer may deduct liquidated damages from payments due to the Contractor; Payment ofliquidateddamages does not affect the Contractor'sliabilities.

36.2 If the Intended Completion Dates extended after liquidated damages have been paid, the Employershallcorrect any overpayment of liquidated damages by the Contractor by adjusting the nextpayment of bill.

37. Costofrepairs

37.1Loss or damage to the Works or Materials to be incorporated in the Works between the Start DateandtheendoftheDefectsCorrectionperiodsshallberemediedbytheContract oratttheContractor'scost ifthe loss ordamage arises fromthe Contractor's actsor omissions.

E. Finishing the Contract

38. Completion

38.1

TheContractorshallrequesttheEmployertoissueaCertificateofCompletionofthe

WorksandtheEmployer will doso upon decidingthat theWorkis completed.

39. Takingover

39.1

TheEmployershalltakeovertheSiteandtheWorkswithinsevendaysofissuingacertificateofCompletion.

40. Final account

40.1 TheContractorshallsupplytothe Employer a detailed account of the total amount that theContractor considers payable under the Contact before the end of the Defects Liability Period. TheEmployer shall issue a Defect Liability Certificate and certify any final payment that is due to theContractorwithin90daysofreceivingtheContractor's accountifitiscorrect andcomplete, If itis not, the Employer shall issue within 90 days a Schedule that states the scope of the correctionsoradditionsthatarenecessary.IftheFinal Account is still unsatisfactory after it has beenresubmitted,theEmployershalldecideontheamountpayabletotheContract orandmakepaymentwithin 60 days of receiving the Contractor's revised account.

41. As built drawings

41.1 If "as built" Drawings are required, the Contactor shall supply them by the dates stated in theContract Data.

41.2 If the Contractor does not supply the Drawings by the dates stated in the Contract Data, or they donotreceivetheEmployer'sapproval,theEmployershallwithholdtheamountstatedintheContractData from payments due tothe Contractor.

42. Termination

42.1 TheEmployerortheContractormayterminatetheContractiftheotherpartycauses afundamental breach of the Contract.

42.2 Fundamental breaches of Contract include, but shall not be limited to the following:

a) TheContractorstopsworkfor45dayswhennostoppageof work is shown on the currentProgramand the stoppage hasnot been authorized bythe Employer.

b) TheEmployerinstructstheContractortodelaytheprogressoftheWorksandtheinstructionisnotwithdrawn within 60 days.

c) TheContractorbecomesbankruptorgoesintoliquidation other than for a reconstruction oramalgamation:

d) A payment due to the Contractor is not paid by the Employer within 90 days of the date of thesubmission of the Bill by Contractor:

e) The Employer gives Notice that failure to correct a particular Defect is a fundamental breach ofContract and the Contractor fails to correct it within a reasonable period of time determined by theEmployer;

f) The Contractor does not maintain a security which is required:

g) TheContractorhasdelayedthecompletionofworksbythenumberodaysforwhichthemaximum amount of liquidated damages can be paid as defined in the Contract data; and

h) if the Contractor, in the judgment of the Employer, has engaged in corrupt or

fraudulent practicesin competing for or in the executing the Contract.

For the purpose of this paragraph: “corrupt practice” means the offering, giving, receiving orsoliciting of anything of value to influence the action of a public official in the procurementprocess or in contract execution. “Fraudulent practice” means a misrepresentation of acts in orderto influence a procurement process or the execution of a contract to the detriment of the Borrower,andincludescollusivepracticeamongTenderers(priortooraftерTende rsubmission)designedto

establish Tender prices at artificial non-competitivelevels and to deprive the Borrower of thebenefits of free and open competition".

42.3 When either party to the Contract gives notice of a breach of contract to the Employer for a causeother than those listed under Sub-Clause 42.3 above, the Employer shall decidewhether thebreach is fundamental or not.

42.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

42.5 If the Contract is terminated the Contractor shall stop work immediately, take the Site safe andsecure and leave the Site as soon as reasonably possible.

43. PaymentuponTermination

43.1 If the Contract is terminated because of a fundamental breach of contract by the Contractor, theEmployer shall prepare bill for the value of the work done less advance payments received up tothe date of the bill, less other recoveries due in terms of the contract, less taxes due to be deductedat source as per applicable law and less the percentage to apply to the work not completed asindicatedintheContractData.AdditionalLiquidatedDamagesshallnot apply.If the totalamount due to the Employer exceeds any payment due to the Contractor the difference shall be adebtpayable to the Employer.

43.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach ofContract by the Employer, the Employer shall prepare ill for the value of the work done, thereasonable cost of removal of Equipment, repatriation of the Contractor's personnel employedsolelyontheWorks,andContractor'scostsofprotectingandsecuringthe Worksandlessadvancepaymentsreceivedup to the date of the certificate, less other recoveries due in terms of thecontract, and less taxes due to be deducted at source as per applicable law and make paymentaccordingly.

44. Property.

44.1All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be thepropertyofthe Employer,if theContract isterminated becauseof acontractor's default.

45. Releasefromperformance

45.1 If the Contractor is frustrated by any event entirely outside the control of either the Employer orthe Contractor the Employer shall certify that the Contract has been frustrated. The Contractorshall make the Site safe and stop work as quickly as possible after receiving this certificate andshall be paid for all work carried out before receiving it and for any work carried out afterwards towhich commitment was made.

F. Special Conditions of Contract

1. Labour:

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements forthe engagement of all staff and labour, local or other, and for their payment, Housing, feeding andtransport.

The Contractor shall, if required by the Employer, deliver to the Employer a return in detail, insuchformandatsuchintervalsastheEmployermay prescribe, showing the staffand thenumbers of the several classes of labour from time to time employed by the Contractor on the Siteand such other information as the Employer may require.

2. Compliancewithlabourregulations:

During continuance of the contract, the Contractor and his sub contractors shall abide at all timesby all existing labour enactments and rules made there under, regulations, notifications and byelaws of the State or Central Government or local authority and any other labour law (includingrules),regulations,byelawsthatmaybepassedornotificationthatmaybeissuedunderanylabour law in future either by the State or the Central Government or the local authority. TheContractor shall keep the Employer indemnified in case any action is taken against the EmployerbythecompetentauthorityonaccountofcontraventionofanyoftheprovisionsofanyActorrules made there under, regulations or notifications including amendments.If the Employer iscausedtopayorreimburse,suchamountasmaybenecessarytocauseorobserve,orfornon-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulationsincluding amendments, if any, on the part of the Contractor, Employer shall have the right todeduct any money due to the Contractor including his amount of security deposit.The Employershall also have the right to recover from the Contractor any sum required or estimated to berequiredfor makinggood the lossor damage sufferedby the Employer.
TheemployeesoftheContractorandtheSub-Contractorinnocaseshallbetreated as theemployees of the Employer at any point of time.

3. ProtectionofEnvironment:

The contractor shall take all reasonable steps to protect the environment on and off the Site and toavoiddamageornuisancetopersonsortopropertyofthepublicorothersresulting frompollution, noise or other causes arising as a consequence of his methods of operation. Duringcontinuance of the contract, the contractor and his subcontractors shall abide at all times by allexistingenactmentsonenvironmentalprotectionandrulesmadethereunder,regulations,notifications and bye-laws of the State or Central Government, or local authorities and any otherlaw, bye-law, regulations that may be passed or notification that may be issued in this respect infutureby the State

orCentral Government or thelocal authority.

The Executive Engineer
PROJECT-3 DIVISION,
Kapila Bhavan, 11th main, 35th cross,
4th T Block, Jayanagar, 560041

SECTION6:CONTRACTDATA

Items marked "N/A" do not apply in this Contract.

The following documents are also part of the Contract: Clause Reference

The Employer is :Executive Engineer (Project-3) Division
[1.1]Address
:BWSSB,G rdFloor,Kapila Bhavan,
11TH Main Road, Jayanagar, Bangalore-560041.

Name of authorized
Asst.ExecutiveEngineer,(Project-
3-2).Representative :BWSSB,Grd Floor,
KapilaBhavan,
11th Main Road, Jayanagar-560041.

The name of theContract andidentification number of the contract is:	:" The Work of construction of Roads, drains, Security wall, Pathways & RWH Pits at Singasandra, AECS Layout, Kudlu and Janatha Colony, Doddakannelli OHT, Reservoir & Pump house Premises."

TheWorksconsistof: Construction of Building.

The start date shall be the date of issue of site hand over letter to proceed

[1.1]with the work
TheIntendedCompletionDateforthewholeoftheWorksis06Months

[15.22]The following documents also form part of the Contract:

[2.2]The Site Possession Date is: 15 days from date of issue of notice to proceed

[18]with the work.
The Site is located at:Singasandra, AECS Layout, Kudlu and Janatha Colony, Doddakannelli Bangalore [1.1]
The Defects Liability Period is 365 days

[27]The liquidated damages for the whole of the works are Rs.0.1% of contract

[36]price per day

The maximum amount of liquidated damages for the whole of the work

[36]is ten percent of the final contract price.
The date by which “as-built” drawings (in scale 1:200) in 2 Sets are

[41]required is within 30 days of issue of certificate of completion.
The amount to be withheld for failing to supply “as built” drawings by

[41]the date required is Rs.25,000-00
The following events shall also be fundamental breach of the contract: [42.2]
1.The contractor has contravened Sub-clause 7.1 and Clause 9 of CC.
The percentage to apply to the value of the work not completed representing the

[43.1]Employer’sadditional cost for completing theworks shall be 30 percent.

SECTION 7:

TECHNICAL SPECIFICATIONS

1.1. SCOPE OF WORK.

The scope of work under this contract shall be as detailed above and as specified in Bill of Quantities in Section-7,

1.2. CONTRACTUAL REQUIREMENTS

1.2.1. Contractor’s Inspection of Sites:

The Contractor is deemed to have visited the sites and familiarized himself of the conditions and restrictions under which the work will be executed. The omission of any details shall not relieve the Contractor of his prima facie obligation and responsibility under the Contract to carry out and successfully complete the rehabilitation works. The Employer will entertain no monetary or other claims, made by the Contractor on the

grounds of ‘want of knowledge’.

The Contractor is advised that it is his sole responsibility to ascertain for himself the extent of work that is required to be done in site and to generally obtain his own information on all matters affecting directly or indirectly the execution of the whole works involved in the Contract to the complete satisfaction of the Engineer. The Engineer will entertain no claim of extras in consequence of any alleged ignorance in any aspect. It must be clearly and definitely understood that the Contractor shall be held solely responsible for making all necessary arrangements and coordinating with relevant authorities, competent agencies and specialists etc., to ensure satisfactory completion of the Contract.

1.2.2. Tender Drawings and Contract Documents: NA

1.2.3. Time of completion.

Time period for completion of all the works shall be 2 Months (inclusive of monsoon period) from the date of issue of notice to commence. Within this period Contractor shall be required to complete the works, including testing, commissioning and completion of the three months Trial run period.

1.2.4. Work plan.

The Contractor shall prepare the work plan for the execution of works, which includes procurement of Construction Materials before starting of the works. The Contractor shall submit the planning’s (Construction, Financial, Quality and Commissioning and handing over planning’s) within 14 days after issue of letter of acceptance and take necessary approvals for the same. The planning’s shall be in the form of a PERT/CPM and a bar chart together with description of his proposed method of working. The planning shall include all allowances to guard against delays caused due to inclement weather or its effects (such as floods or draughts), fire or industrial disputes, unless such events could not reasonably have been foreseen by an experienced Contractor.

1.2.5. Alignment Survey and the L-Sections.

The contractor shall carry out the Survey work for Roads, Drains, and Pathways, RWH Pits for proposed alignment and levels, at every 30 meters interval and other necessary locations, before execution of the work, including all data required for generating L section. Contractor shall submit the survey drawings showing L-Sections, ground levels at every 30 meters interval and other necessary locations, detailed strip plans showing adjacent structures etc., in latest version of AutoCAD for approval of the Engineer before execution of the work. The Bidder has to consider this aspect and make provision, while quoting the rates for the work of Construction of Roads, drains, Pathways and RWH Pits for supply, laying and jointing item in the tender. If the Proposed work are to be changed according to the site conditions and the Engineer In-charge agrees to that, the contractor has to redo the Proposed Drawing of Roads, Drains, Pathway and RWH Pits, and submit all the details in latest version of Auto Cad in soft form to BWSSB, for re-design of that particular stretch and take up the work on receipt of approved designs from BWSSB.

The Survey work for work for Roads, Drains, and Pathways, RWH Pits shall also include the following,

a) All the Survey works shall be carried out from G.T.S. Benchmarks, using Total Station instrument of standard make, and by qualified survey personnel. The survey shall consist of field data collection and related attribute information collection of all the aspects pertaining to work for Roads, Drains, and Pathways, RWH Pits before and after laying of sewer pipes and allied structures, as required by BWSSB.

The Contractor shall, within 21 days after the date of the Letter of Acceptance, submit to the Engineer for his consent a detailed description of the arrangements for conducting the quality control program during execution of the Works, including details of his testing Laboratory, equipment, staff and general procedures. If following submission or at any time during the progress of Works, it appears to the Engineer that the Contractor's quality control programme is not adequate to ensure the quality of the Works, the Contractor shall produce a revised program as desired by the Engineer, which will be adequate to ensure satisfactory quality control.

a. Tests during Construction : As per Sepecification

b. Third Party Inspections: **As per GO No.FD55 Pro-Cell 2004, Bangalore Dt: 17.02.2005, the expenditure on the employment of the quality supervision consultants will be charged to the cost of works and goods and equipment's under procurement, also take action as per circular No. BWSSB/EIC/CE (M)/ACE (M)-I/DCE (M)-II/TA(M)-I/2012/17-18 dt:03.07.2017, further action will be taken to recover the cost of the above in the contract bills**.

1.2.9. Sign Board

The Contractor shall provide sign boards at the sites of the Works of approved size and design as directed by the Engineer, which provides (i) the name of the Project and the financing agency (World Bank loan); (ii) the names and addresses of the Employer, Contractor and Consultants; (iii) short description of the Project, (iv) the Contract amount (v) the starting and completion dates.

Such sign boards shall be located at specified places in the project coverage area as directed by the Engineer. Contractor shall take care of signboard and replace it in case of loss, damage, theft etc., the sign boards may be in English or Kannada or in both as directed by the Engineer.

1.2.10. Protection of Utilities

The Contractor is required to examine carefully the locations of the works and their alignments. Contractor is to make enquiries and co-ordinate with all the departments /authorities concerning all utility lines such as water pipes, sewers, gas pipe, telephone (underground and /or overhead) lines, optic fibre cables, electric and telecommunication cables (underground and /or overhead) , any other utility lines etc;

to determine and verify to his satisfaction the character, sizes, position and lengths of such utilities from authentic records.

The Contractor shall be wholly responsible for the protection of such utilities as may be required, and shall not make any claim for extra work or extra time that may be required to protect such utilities. Any damage, to the Utilities shall be restored/ repaired at Contractor's own cost. Shifting of any utilities if required will be taken up by BWSSB or any other agency separately after site inspection.

In case the alignment of the pipeline crosses the high tension electrical transmission lines belonging to the KPTCL / BESCOM or other authorities/ departments, the Contractor shall take all precautions necessary to see that the work is carried out with care and safety, without disturbing such transmission lines. The Contractor will be responsible to carry out all construction activities in such reaches in consultation with the owners of such facilities. However, satisfactory completion of the entire work will be the responsibility of the Contractor.

1.2.11. Performance Requirements:

The performance requirements have been spelt out in various parts of the Contract specification. The Contractor shall ensure that, he fully understands and complies with all the requirements specified in the Contract. However, in the event of any conflicting performance requirements spelt out in the documents, the Contractor shall promptly bring such matters in writing to the attention of the Engineer for Engineers decision. The Engineer's decision will be conveyed to the Contractor in writing and which is final. The Contractor shall fully comply with Engineer's decision on the matter.

The Contractor is deemed to have read and understood all performance requirements before bidding and he shall have no claim whatsoever with respect to the Engineer's final decision on the matter.

1.2.12. Contractor's Obligations:

The Clauses in this section are meant to provide general guidelines and Compliance requirements to the Contractor. It does not however relieve the Contractor from taking every other step and precautions as deemed necessary to complete the works successfully within the specified Contract period and bid amount. Also, compliance to the approved Environmental management plan and monitoring the same is part of the contract.

12.12.1. Environmental Management Plan and Monitoring.

The Contractor shall be responsible for the mitigation measures to be taken for complying to the Environmental management plan and monitor as described below,

1.2.14. Special Traffic Precautions.

Contractors Attention is specially drawn to the requirements by the traffic police and road authorities and specification regarding traffic control, access and reinstatement of road surface. It is necessary to obtain permission from traffic Inspector of Police prior to taking up any stretch of road for excavation and sewer laying. It is necessary to carry

out the work in such a manner as to cause minimum interference with the public use of roads, footpaths and other thoroug

1.2.15. Working in Restricted areas.

In addition to the clause stated in other section of the special specification the Contractor shall determine prior to constructing the lengths of sewers where access to properties commercial, domestic and institutional will be restricted.

The identification of these areas shall be agreed in consultation with the Engineer, Police and Urban local body. In this case it may be necessary to operate one-way traffic system or to close roads. The Contractor shall be responsible for liaising with the police and other local representatives to obtain permission to close roads or restrict traffic movement. No additional time will be allowed for these pre-construction activities. Where roads are closed alternative routes are to be determined in conjunction with the authorities. Sign Boards are to be placed at both junctions of the route indicating “ROAD CLOSED & WORK UNDER PROGRESS”. The expense for the same shall be borne by the contractor. The Contractor shall discuss these arrangements with the occupants of houses affected to ensure that their disruption is kept to a minimum. The Contractor is to offer assistance to residents who are infirm or need special arrangements for access during construction.

In narrow roads and streets it may not be possible to operate excavation machinery in such cases hand excavation is to be done. The method of operation, length of sewer to be excavated, method of barricading, property access, dewatering, shoring, pipe laying, backfilling and road reinstatement shall be stated in a ‘Method Statement’ to be submitted at least 4 weeks before work is scheduled to commence in a particular location. The written agreement of the Engineer shall be obtained to the method statement. If any additional safeguards are required by the Engineer these shall be incorporated in the method statement at no extra cost and the method statement is to be resubmitted.

The Contractor will ensure that the noise created by his activities is suppressed. Adequate silencers fitted to construction machinery, particularly compressors and drills. Dust is to be kept to a minimum by using water sprinklers. Utility service connections shall be maintained to every property throughout the construction phase and thereafter. If any defect/ damage is caused it shall be repaired immediately and at the Contractors expense. The disruption to the normal activities of residents and other members of the public is to be kept to an absolute minimum. Providing adequate noise control and other nuisances are kept to a minimum, extended working hours may be permitted with the agreement of the Engineer and local residents. No additional payment shall be made for any of these arrangements unless other wise specified. Adequate lighting shall be provided by the Contractor at his cost if night working is adopted.

1.2.16. Order Of Precedence Within Bid Documents

In the event there is any conflict or discrepancy within the Bidding documents, the order of Precedence will be determined as follows;

1. Addendum
2. Contract data
3. Instruction to Bidders
4. Invitation to Bid
5. General conditions contract including special conditions contract
6. Technical specifications
7. Bill of quantities.
8. Drawings

1.2.17. Technical and Supervisory Staff : NA

1.2.18 Measuremnts & Payments.

1.2.18.1. Measurements

a. Quantities

The quantities set out in the Bill of Quantities are the estimated quantities for the Works, and they are not be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfillment of his obligations under the Contract.

b. Works to be Measured

The Engineer shall, except as otherwise stated, ascertain and determine by measurement the value of the works in accordance with the contract and the contractor shall be paid that value in accordance with applicable clauses of this contract. The Engineer shall, when he requires any part of the works to be measured, give reasonable notice to the Contractor's authorized agent, who shall:

a) forthwith attend or send a qualified representative to assist the Engineer or his representative in making such measurement, and

b) supply all particulars required by the Engineer or his representative.

Should the Contractor not attend, or neglect or omit to send such representative, then the measurement made by the Engineer or his representative or approved by him shall be taken to be the correct measurement for such part of the works. For the purpose of measuring such Permanent Works as are to be measured by records and drawings, the Engineer shall prepare such records and drawings as the work proceeds as he deems necessary or appropriate and the Contractor, as and when called upon to do so in writing, shall within 14 days, attend to examine and agree such records and drawings with the Engineer and shall sign the same when so agreed. If after examination of such records and drawings, the contractor does not agree the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor, within 14 days of such examination, lodges with the Engineer notice of the respects in which such records and drawings are claimed by him to be incorrect. On receipt of such notice, the Engineer shall review the records and drawings and either confirm or vary them.

c. Method of Measurement

The Works shall be measured net, notwithstanding any general or local custom, except where otherwise provided for in the Contract.

1.2.18.2. PAYMENTS.

No part payments will be made for all items of works under this contract, except for pipeline works, which will be paid as mentioned in contract data.

1.3 Royalties

1.3.1 The Employer shall deduct Royalties on materials used in the Works from the progress payments to the Contractor at the rates specified in the most recent “Amendment to the Karnataka Minor Minerals Concession Rules - 1969” as published by the Commerce and Industries Department (Mines) and as illustrated in Annexure-1, attached.

1.4 Site Order Book

1.4.1 The Contractor shall maintain an identical pair of Site Order Books (one marked original and the other marked duplicate), at the Site at all times during the execution of the Works for the use of the Engineer and the Contractor. All instructions issued by the Engineer to the Contractor shall be recorded in both sets of the Site Order Book and shall be signed by the issuer and countersigned by the Contractor. After compliance with the instruction, the Contractor shall record the same in both sets of the Site Order Book duly signed and countersigned by the Engineer. Acceptance of any part of the work executed by the Contractor shall be subject to verification with respect to compliance of respective instructions of the Engineer through the Site Order Book. The Engineer shall retain the original copy of the Site Order Book, while the Contractor shall retain the duplicate one.

1.5 Quarry Materials

1.5.1 The Contractor shall be wholly responsible to identify the suitable sources for quarry materials required for the Works, such as earth, sand, stone, muram, etc., and to make his own arrangements for collection and transportation of the materials irrespective of the leads and lifts required. The quarry thus identified by the Contractor should have proper license from the Government of Karnataka. All materials supplied by the Contractor shall satisfy the requirements set forth in the Specifications and shall be subject to the approval of the Engineer. The Contractor shall take this into account while offering his rates and no claims whatsoever shall be entertained for extra costs on this account.

1.6 Inspection And Testing

1.6.1 Inspection of Material to be procured

Inspection and certification of all materials used on the works such as MS Plates / Pipes and Specials , Valves, Cement, Size Stones, Sand aggregate, Lead, Rubber gaskets etc., for conformity with specifications of BIS. If insisted, inspection of materials at the manufacture place shall be arranged by the contractor at his cost including the travelling and accommodation of the inspecting officer.

1.6.2 **Inspection and certification of the various components of works.**

Construction of pipeline with all fixtures, construction of Valve Chamber including back filling of trench in layers with compaction as specified to ensure that all components of works are carried out as per specification and to required standards.

Inspection & Certification of Hydraulic Test on Completed pipe line in reaches as specified.

1.7 Technical Specifications

1.7.1 Engineer shall have the right to modify/alter the Particular Specifications and/or Standard Specifications at any time which promise to confer equal or better quality than the standard specified in the tender document. Such modification or alteration shall be acceptable to the Contractor subject to no additional financial burden to either the Contractor or the Employer.

1.8 Storage Of Materials And Plant

1.8.1 The Contractor shall provide appropriate storage facilities for materials like cement, steel, aggregates, consumable supplies, equipment, mechanical and electrical items, etc., and shall take all safety and security measures against theft and deterioration in quality, at his own cost.

1.9 Procurement Of Materials:

1.9.1 CEMENT:

The Contractor shall use only 43 grade cement conforming to IS 8112 / 89 with latest amendments with ISI mark. The Contractor should furnish the manufacturer test certificate for the above brand of cement for having manufactured the cement as per relevant BIS and guarantee certificate before using the cement.

1.9.2 STEEL:

The Contractor shall procure the steel from VISL / SAIL / VSP / TISCO and manufacturers' test certificate is to be produced.

1.9.3. MS PIPES/MS Plates AND OTHERS

Sl.No.	Description	Make
	MS plate/HR coil to Manufacture MS pipes Conforming to IS: 2062	SAIL, TISCO,ESSAR STEEL, ISPAT Industries,
	Bolts, Nuts and Washers	GKW, TEXSO MAKE, T.V.S. UNBRAKO

1.9.4 Unplasticised PVC Pipes and Fittings

Unplasticised polyvinyl chloride pipes, fittings and specials shall be to BS 3505 for potable water and BS 4346: Part 1 for fittings.

The pipes shall be of the spigot and socket type with approved gasket type flexible joint. The rubber gaskets shall be to BS 2494, Class C.

Where PVC pipes, fittings and specials are to be connected to Ductile iron, stainless steel or steel pipes, 'Viking Johnson' type flange adaptors or stepped couplings shall be used.

1.9.5. Polyethylene Pipes

Polyethylene pipes shall comply with BS 6437. The welding method shall be adapted to international standard and contractor shall obtain the approval of the Engineer before proceeding with such works.

(Any other reputed make as may be approved by BWSSB at a later date by producing the credentials.)

The above branded makes are preferred. In the bid the bidder should specify the make for which the rate is quoted without which the Board can specify any make among the above brands

1.10 Equivalency of Standards and be procured, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be acceptable subject to the Engineer's prior review and written approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the Engineer at least 28 days prior to the date when the Contractor desires the Engineer's approval. In the event the Engineer determines that such proposed deviations do not ensure equal or higher quality, the Contractor shall comply with the standards specified in the documents.

1.11 Samples and Tests

1.11.1 The Contractor shall be responsible to develop a quality control program and to provide all necessary materials, apparatus, instruments, equipment, facilities and qualified staff for sampling, testing and quality control of the materials and the works under the Contract. Without limiting the generality of the foregoing, the Contractor shall either (i) establish a testing laboratory at the site of Works which is adequately equipped and staffed to carry out all sampling and testing in accordance with the requirement set out in the General Specifications and/or these Special Specifications and provide all field equipment and apparatus as necessary to conduct all specified in-situ tests and/or any Tests on Completion, provided the correctness of the equipments are ensured or (ii) arrange for routine sampling, testing and reporting, as required, through a certified independent testing laboratory acceptable to the Engineer. All costs of such sampling, testing and reporting of test results will be borne by the Contractor, and the Contractor shall include sufficient provisions in his tendered rates to allow for independent sampling and laboratory testing under the direction of the Engineer up to 5% of the required tests at no additional cost. The Contractor shall furnish certified copies of all test reports to the Engineer within 3 days of completion of the specified tests.

1.11.2 The Contractor shall, within 14 days after the date of the Letter of Acceptance, submit to the Engineer for his consent a detailed description of the arrangements for conducting the quality control programme during execution of the Works, including details of his testing laboratory, equipment, staff and general procedures. If following submission, or at any time during the progress of Works, it appears to the Engineer that the Contractor's quality control programme is not adequate to ensure the quality of the Works, the Contractor shall produce a revised programme which will be adequate to ensure satisfactory quality control.

II EARTH WORK:

2.1 GENERAL:

2.1.1 The earth work excavation for laying of pipe shall be carried out. The Contractor shall make all excavations required for laying and jointing of the pipeline and construction of pertinent structures as required in the project. Except where otherwise required by the project or instructed by the Engineer, all excavation shall be in open cut to the specified

widths and depths. The Contractor is advised to satisfy himself with regard to the likely conditions that may be met with during the execution of the Works, with regard to the underground obstructions or conditions, necessary dewatering requirements etc. Before commencing the earth work, the Contractor shall carry out detailed survey of the proposed alignment, prepare construction drawings showing the longitudinal section of the ground profile, locations of valves and other appurtenances and submit to the Employer for approval.

2.2 CLASSIFICATION OF EXCAVATION

All materials involved in excavation shall be classified in three categories as follows:

2.2.1 **Ordinary soil:** This includes excavation in all types of soil including soil containing gravels, murums, loose boulders, viz., ordinary gravely soil, hard gravely soil, wet soil, stiff slushy soil, chettu soil and calcareous strata, but exclusive of disintegrated rock, soft rock/shale;

2.2.2 **Soil Containing Disintegrated Rock, Soft Rock and Soft Shale:** This category includes excavation in soil containing disintegrated rock, soft rock or soft shale which can be cut by shovel and no hand or mechanical chiseling is required.

2.2.3 **Medium Hard Rock:** This category includes excavation in lime stone, sand stone, hard shale and schist fissured rock, without resorting to blasting.

2.2.4 **Hard Rock:** This category includes excavation in hard rock requiring hand or mechanical chiseling or blasting. In case of difference in opinion between the classification of rock requiring blasting and that requiring chiseling, wedging, the site of work shall be inspected by the engineer and the decision of the Engineer shall be final and binding on the Contractor.

2.3 LIMITATION OF EXCAVATION

2.3.1 The trench for laying MS Spiral welded pipes shall have minimum width as per standards stipulated or as directed by the Engineer-in-charge. A minimum earth cover of 1.2 m shall be maintained above the pipe top, unless otherwise specified or shown in the alignment drawings.

2.3.2 The Contractor shall be responsible to ensure that the widths and depths of the trenches do not exceed the limits shown in the construction drawings. Should the excavation occur beyond the dimensions specified therein, because of the negligence of the Contractor, the Contractor shall fill the excess space with granular material or concrete as directed by the Engineer. Nothing extra shall be paid to the Contractor on account of this.

2.4 TRAIL PITS

2.4.1 Trial pits may be dug by the Contractor, without being directed to do so, along the alignment as shown on the drawings in advance of the excavations for the purpose of satisfying himself as to the location of under ground obstructions or soil conditions.

2.5 SLIPS AND SLIDES

2.5.1 The Contractor is responsible for proper protection of excavations made by him from any slips and slides. All slides and caving shall be handled, removed or corrected by the Contractor without any extra compensation at whatever time and under whatever circumstances they may occur. The excavations shall be made good and brought to necessary depth, width and levels without any extra cost.

2.6 STCKING OF EXCAVATED MATERIALS

2.6.1 The excavated material shall be stacked on the sides of the trench wherever possible. Wherever it is not possible to stock on the sides of the trench, contractor has to find the place nearby for stocking the excavated material and cart the materials to & fro. Rate for this shall be included in the earthwork itself and no extra rate will be paid for this.

2.6.2 Surplus earth is to be disposed off to a place identified by the contractor approved by the engineer. There is a item for this work and will be paid accordingly.

2.7 Safety measures

The Contractor shall provide adequate safety measures during excavation. They shall include:

1. Barricading all sides of the open trenches.
2. Red danger lights which can be easily visible from dusk to dawn placed at an interval of 20 m.
3. Traffic signals and display boards giving direction for diversion of traffic at the appropriate places as may be directed by the Engineer.
4. Adequate safe wooden plank / board or steel plate over the trenches to facilitate crossing by the public residing on either side of the trench.
5. Round the clock watch and ward maintaining all safety regulations at the site of work and protecting the site from unauthorised intrusions.

2.8 Progress of Excavation of pipe trenches

The Contractor shall adjust excavation of trenches in such lengths that the pipes can be laid in such exposed portion of the trench within 2 days.

2.9 Shoring and Bracing

The Contractor shall supply, fix and maintain necessary sheathing, shoring and bracing etc., in steel or wood, as may be required to support the sides of the excavation, to protect workmen in the trench and to prevent any trench movement which might any way injure or delay the work, change the required width of the trench, make unsafe condition for adjacent pavements, utilities, buildings or other structures above or below ground.

Sheathing, shoring and bracing shall be withdrawn and removed as the backfilling is being done, except when the Engineer may agree that such sheathing, shoring and bracing be left in place, at the Contractor’s request. In any case, the Contractor shall cut off any such sheathing at least 600 mm below the surface and shall remove the cut off material from the trench.

All sheathing, shoring and bracing which are left in place under the foregoing provisions shall be removed in a manner so as to not endanger the completed work or other structures, utilities or property, whether public or private.

2.10 Contractor’s Responsibility

The Contractor shall be responsible for the adequate pumping, drainage and bailing out water from the excavated trench. In case of failure to make such provisions or any other provisions which may result in unsuitable sub-grade conditions, the Contractor shall replace and repair the sub-grade as directed to the satisfaction of the Engineer, at his own cost and responsibility.

Should the Contractor select to use a gravel sub-grade to facilitate flow of water to pumps or other points of disposal, such gravel sub-grade shall not be measured or paid for as an extra item.

2.11 Works Included in Excavation

The following works as per specifications are also included in excavation and the term 'Excavation' shall construe to mean all such items of work. The quoted rates should include the same:

1. Provision of side space or additional space in the trench/pit for working and/or accommodating sheathing, shoring, bracing, etc.
2. Supply, installation and removal after the work, all sheathing, shoring and bracing required to protect the excavation where required or where such work is recommended by the Engineer.
3. Protection of excavations.
4. Providing adequate safety measures.
5. Additional work in connection with overhead wires and poles.
6. Excavation for Socket hallows.
7. Supplying and fixing of sight rails and boning rods in the trench to facilitate measurement of work.

2.12 Measurement and Payment for Excavation

2.12.1 For Excavation

The measurement for excavation shall be considering the allowable widths, depths with allowed side slopes (if any) for different classes of soils as per approved classification. The measurement for excavation shall be based on "neat line" dimensions as specified in the drawing or Specifications, for different types of soils and depth of excavation. The total volume of excavation shall be computed as a square bottomed trench of width equal to the outer diameter of the pipe, with minimum working space as given in the drawing, added to it, length up to the length of the trench being measured. The depth of trench being average depth taken at 30 m intervals, between the level of bottom of trench and the original surface of the ground. The length of the trench shall be measured as per the actual length of pipes and fittings / specials laid at work site. However depth shall be measured at closure intervals at vulnerable places. The volume of excavation for structures like valve chambers, thrust blocks and anchor blocks etc., shall be computed and measured for payment as per the bottom area of the particular structure on outer periphery multiplied by the average depth between the level of the finished bottom of the structure and the original surface of the ground. The quantity shall be measured in cubic meters correct to two decimal places. The method of measurement for excavation in different classes of soils shall be as follows:

2.12.2 In Ordinary Soil and Soil Mixed with Disintegrated Rock and Soft Rock / Shale

In this category of soils, the excavation quantity shall be computed as specified above.

2.12.3 In Hard rock

In case of hard rock requiring chipping or chiseling, measurements shall be taken prior to and after chiseling and the volume of rock excavation shall be measured based on this difference. The excavation in rock shall be paid on stack measurements with a deduction of 40% in volume for voids.

2.12.4 For Excavation in Combination of Ordinary Soil, Disintegrated Rock, Soft Rock/Shale and Hard Rock/Schist

Wherever the excavation is undertaken in combination of ordinary soil, disintegrated rock, soft rock /shale and hard rock, the hard rock part shall be measured and paid, the soil part shall be measured and paid for the total measurable excavated quantity deducting the quantity measured for the hard rock. The total computed volume of excavation shall be equal to the sum of the computed volumes for each category of excavation undertaken.

III. BEDDING.

3.1. Bedding for the pipe

Bedding shall be provided all along the stretch of the pipe line, which differs based on the area through which the pipe line passes. However, the type of bedding to be provided shall be as decided by the Engineer.

3.2 Earth Bedding

The Drains/Path ways/pipes shall be placed on the natural, undisturbed earth bedding, which has been carefully shaped to fit the lower part of the Drains/Path ways/pipes for a width of at least 50 % of its external diameter. The trench shall be excavated to an extra breadth and depth, wherever weld joints are coming. Filling and removing earth or similar materials beneath the pipe to adjust with the grade will not be permitted except filling with compacted granular bedding material or murrum.

3.3 Gravel Bedding

Wherever rock is met with, it shall be removed up to 150 mm below the bottom level of the pipe to a minimum width equal to the width of the trench and the resulting space shall be filled up with good quality compacted gravel. The granular material shall be filled in the trench up to the level of ¼ the outer diameter of the pipe line, above the bottom of trench and well compacted. Unless otherwise directed by the Engineer, rock excavation shall progress at least 20 m in advance of the pipe length proposed to be laid.

3.4 Measurement for bedding:

The Contractor shall include the cost of earth bedding required for the pipeline in the tendered rate for pipe laying, for providing gravel bedding. The surplus quantity of excavated earth shall be disposed off. The quantity shall be measured in cubic meter correct to two decimal points.

IV BACK FILLING

4.1 General

The Contractor shall use selected surplus spoils from excavated materials for backfilling. All fill material shall be subject to Engineer’s approval. The excavated materials suitable for backfilling shall be stored not closer than 600 mm from the edge of the trench and shall not obstruct any public utilities or interfere with travel by local inhabitants or general public. Handling and storage of excavated materials must meet with the regulations of the Local Government Authorities. The detailed specifications for backfilling shall be as per Clause 8 of IS: 3114-1994 and Clause 4.11 of IS 12288-1987.

4.2 Method of Backfilling

Trenches and excavated pits for structures shall be backfilled to original ground level or to such other levels, as the Engineer may direct. All backfilling shall be carried out in orderly manner expeditiously and consistent with good workmanship.

4.2.1 Backfill material put into the trenches/pits for backfilling, shall unless otherwise specified be compacted and built up as to minimise future settlement as much as is reasonably possible. For this, care shall be exercised in selecting backfill material free from large hard clay lumps, especially in cramped areas directly adjoining the walls of structures.

4.2.2 Backfilling in trenches shall be done as pipe laying progresses, with the permission of the Engineer, after the pipe or conduit is properly bedded, jointed and inspected and all measurements for the location of Y-Junctions, tees, etc., are properly recorded by the Engineer and sufficient time is allowed for the joint materials or cement concrete or

mortar to set. However the joints shall be left open for inspection during testing, which shall be backfilled after successful completion of testing, after obtaining permission from the Engineer. Backfilling around and over the pipe, conduit, or structure shall be taken up uniformly on all sides and in the sequence and manner specified hereinafter, with care to avoid the displacement or damage to the pipe, conduit or structure. For the purpose of backfilling, the depth of trench shall be divided into the following three zones measured from bottom to top of trench, as follows:

i. Zone A : From bottom of trench to the centre line of pipe,
ii. Zone B : From the level of centre line of pipe to a level of 300 mm above the top of pipe,
iii. Zone C : From a level of 300 mm above the top of pipe to the top of trench.

4.2.3 Backfilling in the trenches and around structures shall be carried out in horizontal layers of uniform thickness of not more than 150 mm when measured loose. As may be necessary to attain maximum compaction, the backfill material shall be moistened by sprinkling with water. After placing each layer of backfill material, the layer shall be thoroughly and uniformly compacted by means of mechanical or hand tampers. The compacting equipment and the manner of its use shall be subject to the approval of the Engineer.

4.2.4 After the backfill material is placed in Zone A and Zone B as specified above, the remaining portion i.e., Zone C of the trench may be machine backfilled. Even in this case the backfill material shall be placed in uniform horizontal layers of not more than 150 mm thickness. Small pebbles of size less than 50 mm, if any, shall be so distributed throughout the mass, that all interstices are solidly filled with fine material. The backfill material shall be tamped with mechanical tamping equipment, after moistening the backfill by sprinkling with water to obtain maximum compaction (min 95% proctor density).

4.2.5 Machine backfill shall be so conducted that the material deposited in the trench shall not fall directly on top of the pipe from such a height as might result in damage to the pipe joints or alignment.

4.2.6 If the trench is subjected to conditions which might cause flotation of the pipe before sufficient backfill has been placed, the Contractor shall take the necessary precautions to prevent floatation of the pipe, conduit or structure.

4.2.7 Before final acceptance of the work, additional tamped earth shall be added to restore the settled trench surface to the required level of the adjacent earth surface or to the base of crushed rock wearing surface or to the finished earth base.

4.2.8 If from the excavated soil, enough backfill material is not available, imported, selected and approved backfill material from the borrow pits is required to be placed for backfill, on approval of the Engineer backfilling of trenches where the excavation is in the rock shall be with the surplus soft soil, with all lead and lift.

4.3 Disposal of Surplus Excavated Material

The excavated material which is in surplus to the requirements after backfilling shall be removed and spread at places shown by the Engineer, with all lead and lift from the site of work, for which payment shall be made as per the quoted rates. No surplus or excess material shall be disposed in a stream / channel or in any place where the pre-construction surface drainage may have to be provided, without written permission of the Engineer.

V. MILD STEEL PLATE/PIPES

5.1 Scope

This specification covers the general requirements for fabrication, laying, testing and

commissioning of longitudinal & circumferential welded mild steel SAW pipes above /below ground, including associated civil works required for the same.

5.2 Standards

The following specifications, standards, and codes are part of this specification. All standards, specifications and codes of practice referred herein shall be the latest edition including all applicable official amendments and revisions.

In case of discrepancy between this specification and those referred to herein, this specification shall govern,

IS 2062	Steel for general structural purposes
IS 808	Dimensions for hot rolled steel beam, column channel and angle sections
IS 814	Covered Electrodes for manual metal arc welding for carbon and carbon manganese steel
BS 5155	Specifications for butterfly valves
AWSS-5.1	Specification for mild steel covered arc welding electrodes
IS 3613	Acceptance tests for wire flux combination for submerged arc welding
AWS: A-5.17	Specification for Bare Mild Steel Electrodes and Fluxes for submerged arc welding
IS1367	Technical supply conditions for threaded steel fasteners.
IS2016	Plain washers
IS2074	Ready mixed paint, air dying, red oxide zinc chrome. Priming
IS1786	High yield strength deformed steel bars and wires for concrete reinforcement
IS432 (Part-1)	Mild steel & Medium Tensile bars and hard drawn steel wire for concrete reinforcement: Part 1 Mild steel and medium tensile steel bars
IS432 (Part 2)	Mild steel and Medium tensile steel bars and hard drawn steel wire for concrete reinforcement: Part 2 Hard drawn steel wire
IS 269	33 grade ordinary Portland cement
IS8112	Specification for 43 grade Ordinary Portland Cement
IS8041	Specification for Rapid hardening Portland cement
IS383	Specification for coarse and fine aggregate from natural source
IS12330	Specification for Sulphate Resisting Portland cement
IS 4353	Submerged arc welding of mild steel and low alloy steels recommendations
IS456	Code for practice for plain and reinforced concrete
IS800	Code of practice for general construction in steel
IS816	Code of practice for use of Metal arc Welding for General construction
IS817	Code of practice for Training and Testing of Metal Arc Welders
IS1182	Recommended practice for Radiographic examination of Fusion Welded Butt joints in steel plates

IS2595	Code of Practice for Radiographic Testing
IS3658	Code of practice for Liquid Penetrant Flew Detection
IS5334	Code of practice for Magnetic Particle Flaw Detection of welds
ASTM E 94	Recommended Practice for Radiographic Testing
ASTM E 109	Dry powder Magnetic Particle Inspection
ASTM E 138	Wet magnetic Particle Inspection
ASTM E 165	Liquid Penetrant Inspection
IS 3600	Methods of testing of Fusion Welded joints and Weld metal in steel
IS 483	Recommended practice for Radiographic inspection of fusion welded butt joints in steel pipes
IS 3589	Specification for seamless or Electrically welded pipes for water, Gas and Sewage
IS 6631	Steel pipes for Hydraulic purposes
IS 7343	Code of practice for ultrasonic testing for ferrous Welded Pipes and Tubular Products
IS 2598	Safety code for Industrial Radiographic Practice
IS 5822	Code of Practice for laying of electrically welded steel pipes for water supply
IS 1566	Hard drawn steel wire fabric for concrete reinforcement
IS 6419	Welding rods and bare electrodes for glass shielded are welding of structural steel
IS 1974	Bare wire electrodes for submerged arc welding
IS 7307	Approval tests for welding procedures
IS 7310	Approval tests for welders working to approved welding procedures
IS 2720	Methods of test for soils
IS 780	Specification for Sluice valves for water work purposes. (50 to 300mm size)
IS 2906	Specification for sluice valves for water work purposes (350 to 1200mm size)
IS 1916	Steel cylinder pipe with concrete lining and coating
IS 7322	Specials for steel cylinder reinforced concrete pipes
IS 11906	Recommended for cement mortar lining for cast iron, mild steel and ductile iron pipes and fittings for transportation of water.

5.3 Materials

Steel plates – The steel plates for pipes fittings, specials and stiffeners shall be of mild steel conforming to IS2062 Grade B, with no negative tolerances on the plate thickness

Cement – Ordinary Portland cement conforming to IS 269.
Aggregate – The aggregate shall confirm to IS 383
Water – The water used in preparation of concrete mix shall conform to the requirements of mixing water specified in IS : 456
Welding consumables – such as electrodes, filler rods and wires shall conform to IS 814, IS 3613, IS 6419 and IS 7280
When requested by the Engineers, the contractor shall provide test sample of the

materials to be used in the works for testing. The cost of such tests shall be borne by the contractor and shall be included in his item rates.

5.4 Inspection

All works and material under specification will be rigidly inspected during all phases of manufacture and testing and such inspection shall not relieve the contractor of his responsibility to furnish materials and performed work in accordance with this specification.

The contractor will notify the engineer, in advance of the procurement of materials and fabrication thereof, in order that the employer may arrange for mill and shop inspection. The engineer may reject any or all materials or work that does not meet with any of the requirements of this specification. The contractor shall rectify or replace such rejected material/performed work at his own cost, to the satisfaction of the engineer.

The Engineer shall have free access to those parts of all plants or any other premises and sites that are concerned with the furnishing of materials or the performance of the work under this specification.

The contractor shall supply free of cost required specimen of materials for testing by the employer at any time during the progress of work and shall bear the cost of all such tests or retests to the satisfaction of engineer.

The contractor shall provide 2(two) sets of accurate “GO” and ‘No Go’ ring gauges to measure the diameter of pipes, specials and fitting for the use of the Engineer at no extra cost.

5.5 Manufactures of Pipes/Plates and others

5.5.1 General

The Plate/pipes shall be truly cylindrical, and straight in axis. The ends shall be accurately cut and prepared for field welding the external circumference of the pipe pieces which are to be fixed adjacent to the flange adapter with fixed outer diameter shall not deviate from theoretical one by more than 2mm. to obtain this accuracy the pipe shall be rolled several times, if necessary, as pipe pieces should be truly cylindrical. The external longitudinal welding of this pipe shall be ground smooth flush with surface to the satisfaction of the Engineer, for a length of 200 mm from the ends of the pipe. No extra cost shall be charged by the contractor for this grinding work.

Minor repair by welding or otherwise shall be permitted at the discretion of the engineer, but such repairs shall be done only after obtaining the prior permission from the Engineer. Any pipe or part thereof, which develops injurious defects during welding or other operations, shall be rejected.

5.5.2 Fabrication Yard

This fabrication yard meant for fabrication of pipes, specials etc shall also be equipped with facilities for testing, painting, lining, etc. For completing the work under the present contract within the contract period, the fabrication yard shall be equipped with adequate numbers of equipment and plant including:

- Plate bending machine for rolling of pipe drums

- Automatic welding machines (suitable for circumferential as well as longitudinal welding)
- Hydraulic welding machines
- Traveling gantry or crane of capacity 10 tonnes or above
- Mobile cranes for loading/unloading of plates, pipes etc. 15 tonnes capacity each
- Lathe for machining of the flange rings, plates etc.
- Equipment for sand blasting, cement mortar lining, and facilities for bitumen wrapping

The fabrication yard shall have adequate area, and shall also have stacking areas for the stacking of plates, pipes and fittings. The contractor shall make his own arrangements for any area required.

5.5.3 Demonstration

Contractor shall demonstrate the works in this contract at fabrication yard before commencement of works and during the works at intervals specified and as directed by the Engineer. No payment shall be made in this regard.

The works under demonstration shall include but not limited to the following:

- Manufacture of pipe and specials
- Machine and manual welding to qualify 'Welding Procedures'
- Hydraulic testing
- Pipe handling procedures

5.5.4 Cutting plates to size

The plate provided shall be utilized so as to minimize wastage and so as to make the pipe as far as possible with one longitudinal joint. Plate sizes shall generally suitable for fabrication of 1.5 m long shells (minimum), to be made up to pipes of 6.0 m to 12 m lengths to suit contractor's proposed working methods.

Before cutting, all the edges of the plates shall be cleaned by brushing/grinding both the sides.

After the plates are cut, the edges shall be made smooth and even by polishing with an electrical or pneumatic grinder to remove all inequalities. Care shall be taken to see that the cut edges of the plate are perfectly straight. Jigs to be used for this purpose shall depend upon the types of cutting machine used. The plates cut to the required shapes shall be checked for the correctness before they are rolled into pipe drums. If any correction is required, the contractor shall do the same by re-cutting, if necessary. If any plate or flat is found to be warped, to have corrugations, the defects shall be removed by putting the plate or flat into a roller press and rectified. Laminated or heavily corroded plate shall not be used in manufacturing of the pipe.

The ends of the finished pipe in the factory shall necessarily have bevel ends conforming to IS 3589 to facilitate field welded joints.

5.5.5 Rolling of Plates

The plates cut to the exact size shall be put into a rolling machine to form a pipe of the required diameter. The contractor shall adjust the rolling machine so as to give a uniform curvature to the pipe throughout its circumference. The curvature obtained shall be checked by the contractor's foremen during the process of rolling and if proper curvature is not obtained at any place including the ends, the rolling operation shall be repeated at this stage or even after the longitudinal welding of the drum where directed. Heating of plates to obtain the desired curvatures shall not be permitted.

5.5.6 Tracking the Drums

The rolled drums shall be kept on an assembly platform for tracking, care being taken to ensure that the tacked drums have either faces at right angles to the axis of the pipe. A gap of 2 mm to 4 mm shall be maintained while tacking the drum, where the manual arc welding, is permitted. However, where the welding is to be done by automatic welding machine, there is no need to maintain such gap. To achieve this objective, clamp spiders, tightening rings and or any other approved gadgets shall be used. Each drum, before being taken to the assembly platform, shall be numbered on the inside with oil paint, stating the plate thickness as well.

5.5.7 Assembly of Drums into Pipes

The tacked drums shall then be transported to an assembly platform where they shall be welded together to form suitable pipe-lengths. Plate shall be bent in the maximum possible width to reduce the number of circumferential joints. The number of longitudinal joints shall be as per IS 3589.

The longitudinal joints shall be staggered at 90 degrees. The drums shall be tacked together as above. The assembly shall be truly cylindrical and without any kinks. The faces shall be at right angles to the axis of the cylinder. A suitable arrangement for testing the correctness of the pipe shall be provided by the contractor at the assembly platform.

5.5.8 Specials

Specials shall be fabricated to the dimensions shown on drawings. Specials, such as tees, Y-pieces, bends, tapers, etc. shall necessarily be in steel and shall be in accordance with IS 7322/BS 534/AWWA C208 and ASME standards and tested and laid in the same manner as the pipes.

Standard fittings shall be used wherever possible in preference to fabricated fittings. Standard fittings shall be manufactured in accordance with standards above. Where fabricated fittings are supplied with approval of Engineers they shall be fully workshop fabricated and tested in accordance with above standards.

Tee and branches on steel pipelines must be reinforced by welding collars around the base of the branch and in the case of large diameter branches, increasing the main pipe wall thickness or making use of crotch plates. Unless shown otherwise on the drawings branches shall comply with the requirement of the following table:

Fitting Description Pipe work O.D. (mm)	Main Pipe wall Thickness (mm)	Branch Pipe Wall Thickness (mm)	Collar Details (mm)
324 off 1320	10	5.0	150 Wide x 14 to 25 Thick
324 off 1320			
324 off 1999-Level Invert Tee	14/12	5.0	150 Wide x 14 to 25 Thick
324 off 1647	14/12	5.0	
324 off 1241	11/12	5.0	150 Wide x 14 to 25 Thick
	8/10	5.0	150 Wide x 14 to 25 Thick
			150 Wide x 14 to 25 Thick

The fittings shall be designed and, if considered necessary by the Engineer, fabricated by a specialist contractor and the design calculations and drawings shall be submitted to the Engineer for approval. For oval shaped collars the width given in the above table shall be at the narrowest point. All other fittings, tees, branches, crosses and bends are to be designed by the fabricator.

Steel specials shall have the same chemical and mechanical properties and shall be compatible in all respects with the pipes with which they are to be used. The marking of pipes and fittings shall be as specified.

5.5.9 Electrodes

The contractors shall use appropriate type and size of electrodes with suitable flux covering depending on the thickness of plate and the type of joint. They shall also use standard current and voltage required for the machine in use as per manufacturers directions. Welding electrodes shall conform to IS 814 and IS 4353. Electrodes from reputed manufacturers like Advani Oerlikon, D& H, Philips etc. shall be used with the approval of Engineer. India made or equivalent foreign made electrodes of the approved quality shall be used. The contractor shall provide suitable equipment and ovens to keep the electrodes dry at the desired baking temperature.

5.5.10 Welding

Upon receipt of the order and prior to the start of fabrication, the contractor shall submit to the Engineer for his approval the 'Welding Procedure Method Statement' he intends to use in the shop work. At the same time the procedure for the field welding must be submitted to the Engineer for his approval.

All components of pipe shell, either straight or bent etc shall be welded by use of automatic arc welding machine by submerged arc process with alternating current. The strength of the joint shall be at least equal to that of the parent material. Manual welding shall be adopted only when machine welding is not possible.

The contractor shall use electrodes of approved make and size, the size depending on the thickness of the plate and the type of joint. Standard current and arc voltage required for the machine shall be used with necessary modifications as may be found necessary after experimental welding. For this purpose, samples of welded joints shall be prepared and tested in the presence of the Engineer for qualifying the welded procedure Method statement. Only approved welding procedures of the Engineer shall be obtained.

All the shop and the field welding conform to IS 4353, IS 9595, IS 816.

All longitudinal and circumferential joints shall be Single-V or Double-V butt joints with or without backing plates. After completing the welding joints of pipes or plates from one side, and before the welding on the other side, the joints shall be back chipped/ gouged and ground to remove irregular penetration till the even surface is exposed. Gouging shall be restored to when the plate thickness is above 6mm.

All circumference welds involving plates of unequal thickness shall be so kept that the inside surface of plates match to provide stream lined joints without alteration in the internal diameter.

The welding shall be the best workmanship free from weld defects. In order to maintain a good standard in welding, welders shall be tested by the contractor before they are entrusted with the job. Qualification standard for welding procedures, welders and welding operators shall confirm IS 7307 and IS : 7310 (latest). Only those who pass the test shall be allowed to work on the job. Periodical tests as regards their competence shall also be taken at suitable intervals and those found incompetent shall be removed from the job. If an incomplete welder has already welded some pipes, all welding done by him previously shall be fully checked by X-ray in addition to the regular X-ray inspections. The defects if any, shall be rectified to the satisfaction of the Engineer. All such check tests and rectification of defects shall be entirely at the cost of the contractor. No pipes or steel sections shall be erected unless the work of the welders concerned has been proved to be satisfactory and qualified. Site welds shall be done by welders qualified for the various welding positions as per applicable IS codes and standards.

A record shall be maintained showing the names of welders and operators who have worked in each individual joint. Manual arc welding shall preferably be carried out by a pair of welders so that by, observing proper sequence, distortion can be avoided. A joint entrusted to a particular individual or a pair shall be as far as possible, completed by them in all respects, including sealing run. No helper or other unauthorized person shall be permitted to do any welding whatsoever.

The weldment should not become brittle or sensitive to blows and there should be no loss of toughness due to welding or heat treatment. The material after welding and heat treatment shall match with the base metal properties including original ductility. The weld should in no point be less than the nominal thickness of plate a slight reinforcement as per IS code shall be maintained on all weld joints. Final welding of closure gaps should be carried out within a temperature range of average air temperature ± 8° C.

Where required by the Contractors working methods the pipes shall have cable holes /entries installed in the fabrication shop; they shall comprise a hole in the pipe with a reinforcing plate welded to the pipe with a tapped hole in it large enough to allow the passage of the cables and other paraphernalia necessary for welding the pipes. A screwed plug shall be provided to close the hole.

5.5.11 Testing of Weld Coupons

Test pieces shall be provided by the contractors for both longitudinal and circumferential welded and joins at the positions pointed out by the Engineer the sample so taken out shall then be cut to the exact shape and dimensions and machined as described in relevant standards before testing for chemicals and mechanical properties.

The entire cost of the tests including provision of test samples, machining the test pieces, transport to and from the laboratory and testing them in a laboratory, payment of all testing fees, cleaning and painting etc. shall be borne by the contractors. The tests shall be carried out in a government or semi government institute approved by the Engineer. This shall be arranged by the contractor with the approval of Engineer. the testing laboratory shall have instruments/ equipments which are having calibration requirements traceable to National or International standards.

The following tests shall be carried out:

Mechanical Tests

The test plates shall be subjected to all mechanical tests as per the approved method statement, or as otherwise reasonably directed by the Engineer. Test shall be carried out in the accordance with relevant standards. The tests shall include determination of yield strength, tensile strength, elongation and bend tests. Tensile test shall be carried out in accordance with IS 1894. One test plate shall be provided for from each lot of 100 lengths.

If a test specimen shows defective machining or develops flaws not associated with welding, it may be discarded and another specimen submitted. The welded joint shall exhibit mechanical properties not lower than those specified for highest 2062 Grade B.

Guided bend test shall be in accordance with IS 3589/IS 3600. One bend test shall be carried out from each lot of 50 lengths. The test shall comply with the requirements specified in IS 3589/ IS 3600.

Field Joints

The field welded joints shall be tested in accordance with the proce3dure laid down in IS3600. One test plate shall be taken for every 10 joints and shall be subjected to mechanical and chemical tests as specified above.

5.5.12 Re-tests

If the results of tests of any lot do not conform to the requirements specified, retests of two additional specimens from the same lot shall be made,. Each of which conform to the required specifications, in case of failure of one or both, gouging and repairing shall be carried out to the particular lot of joints from which the samples have been taken as directed by Engineer before the lot can be accepted. The rectification process shall also have adequate tests plates and they shall be tested for complaints with the IS codes/standards.

In case both the samples yield satisfactory results in the retest described above, gouging and repairing will be required to the carried out on the joint which has failed in the initial test only.

All charges in connection with retesting of the welded sample including machine, testing etc. shall be borne by the contractor.

5.5.13 Radiograph of Welded Joints

As soon as practicable, after welding is done, every longitudinal and circumferential welded length minimum 10% (ten percent) length of the weld at random for each pipe shall be radio graphed, to detect welding defects as per the requirement of IS4853 and as directed by Engineers. This 10% sampling will be at random but ensured 100% coverage of junctions of longitudinal and circumferential joints. If the results of such radiography fail to conform to the requirements, the contractor shall carry out 100% radiography test for the pipe as directed at the contractors cost to the satisfaction of the Engineer.

The weld repels or welds surface irregularities and slag etc., on both inside and outside shall be removed by any suitable mechanical process to a degree such that result in radiographic contact due to any remaining irregularities cannot mark or be confused with that of objectionable defect. The radiograph shall be made in strict accordance with the latest requirements and as per the latest and most efficient technique either with X-Ray or gamma ray equipment. The safety requirement during radiography shall be in accordance with IS 2598.

The radiographs are to be marked in such a way that the corresponding portion of the welded seam and the welder can be readily identified. All radiographs will be reviewed by the Engineers to identify the defects and determine those, which requires rectification. Defects that are not acceptable shall be removed by chipping; grinding or flame gouging to sound metal and resulting cavities shall be welded. After rectification, the joint is to be radio graphed again to prove the quality of the repair. The radiograph will be judged as acceptable or un acceptable by the Engineer based on the latest standards prescribed by the relevant Indian standard specification.

All X-rays shall be taken with equipment and by personal of the Contractor. Films shall be developed within 24 hours of exposure and be ready in accessible at all times for inspection by the Engineer. the contractor shall provide for the use of the Engineer suitable X-Ray viewing equipment. X-Ray films shall be properly maintained by the contractor. A complete set of radio graphs and records as described in IS : 2595, for each job shall be retained by the contractor and shall be handed over to the BWSSB on completion of the Contract. All films shall be identified by the number and chart prepared indicating location of any work associated with the pipe erection and such inspection shall be performed by the radiographer at the discretion of the Engineer.

Radio graphic inspection of welded joints:

All welded joints to be radio graphed shall be examined in accordance with

IS 2595 - Code of practice for Radiographic Testing
IS4853 - Recommended Practice for Radiographic examination of fusion welded Butt-joints in steel pipe
IS1182 - Recommended Practice for Radiographic examination of fusion welded Butt-joints in steel pipe

IS2598 - Safety Code for Industrial Radiographic Practice

Radiographer performing radiographs shall be qualified in accordance with SNT-TC-1A . Supplement and appendices "Recommended Practice for Non-destructive Testing Personal Qualification and Certification" published by the American Society for Non-Destructive testing as applicable for technique and methods used.

Final acceptance of Radiographs shall be based on the ability to see the prescribed pentrameter image and the specified hole.

Sections of welds that are shown by Radiography to have any of the following types of imperfections shall be judged un-accepectable and shall be repaired.

- Any type of crack, or zone of incomplete fusion or penetration
- Any elongated slag inclusion which has length greater than 6 mm
- Any group of slag inclusion in line that have an aggregate length greater than thickness in a length of 12 times thickness, except when the distance between the successive imperfection exceeds 6 L where L is the length of the longest imperfection in the group.
- Rounded indication in excess of that specified by the acceptance standards given earlier.

5.5.14 Tolerances

Tolerances of the plate thickness shall be ± 3%. Minimum width of the plate shall be 1.5m.

A tolerance for straight pipes shall be in accordance with IS 3589 or as amended below.

Finished pipe sections shall be truly straight with walls parallel to the axis of the pipe and shall not be out of the alignment by more than 0.2% of the total length.The outside circumference of the pipe shall not vary by more than 0.5 per cent.

VI CONSTRUCTION OF MATERIAL AND OTHERS:

6.1 Bedding

The depth and type of bedding shall be as shown in the Drawings or as directed by the Engineer. Where rock or boulders are encountered, the trench shall be transmitted to a depth of at least 300 mm below the level at which the bottom of the barrel of the pipe is to be laid and filled to a like depth with sand as shown on the Drawings or as directed by the Engineer.

The class of bed and surround to be used are indicated below:

Class of bed and surround	Brief description of bedding material
Class N Class S	Well Graded Sand Granular material

Class S bed and surround shall be used on all pipes unless otherwise specified or shown on the Drawings.

Class N bed material shall only be used where the pipe trench is founded in hard rock or otherwise directed by the Engineer. the sand shall be clean and well graded and free from topsoil, clay or vegetable matter and to the approval of the Engineer. if the sand supplied is unclean it shall be washed. In no case shall sand containing more than 3.5% by dry volume or 5% by wet volume of clay, loam or silt be accepted. Tests specified for determining silt in sand and organic impurities as described in IS 383 shall apply.

The graded granular bed material for use in Class S bedding and surround shall consist of durable gravel, crushed stone or disintegrated rock. Selected material excavated from

the pipe trench may be used, provided it contains no topsoil, clay or vegetable matter and is to the approval of the Engineer and shall be supplied with the certification which gives details of its content of the granular material shall not exceed 0.5% and 0.06% by weight respectively.

Graded Material.

The Contractor's method of grading the excavated material shall be to the approval of the Engineer. All Class S graded material shall pass through test sieves to IS 460 (Part 1) in the following proportions by mass :

Aperture Size	Percentage passing
50 mm	100%
37.5 mm	90 - 100%
20.0 mm	35 – 70%
14.0 mm	25 – 55%
10.0 mm	10 – 40%
5.0 mm	0 - 5%

6.1 Construction of Class S bed and Surrounds

Class S pipe bed and surround shall be constructed as indicated on the Drawings.

The granular material shall be evenly spread over the full width of the formation and lightly compacted to a level slightly higher than level corresponding to the underside of the pipe barrel to allow for settlement of the pipe to the correct level.

Following placement and jointing of the pipe further granular material shall be placed in the trench, special care being taken to fill under the sides of the pipes to ensure full contact with the barrel of the pipe.

Field joints which have not been tested shall be left exposed for a minimum length of 150 mm each side of the joint. The granular material shall then be placed and compacted evenly on both sides of the pipe to a depth of 300 mm above crown of the pipe.

Trench supports shall be withdrawn gradually in accordance with the progress of the fill with the provisions that such withdrawal shall not prejudice the safety of the works.

The contractor shall ensure that the material to the sides of the pipe is adequately compacted in layers having a maximum thickness of 150 mm and that the method of compaction used shall achieve not less than 95 % of the maximum dry density as determined from IS 2720: Part 7

After each section of the pipeline has passed the hydraulic test, the exposed joints shall be backfilled and compacted to the above specification.

The same general requirements shall apply to Class N bedding.

6.2 Internal Cement Mortar Lining

All pipes and fittings shall be internally lined with cement mortar in accordance with IS:11906/AWWA C602. Cement mortar in lining shall be applied in-situ after pipe laying and after sectional hydraulic testing.

Cement shall be Portland cement in accordance with IS 8112

Sand used for lining shall be tested with standard sieves as per IS 460 and requirements specified in IS 11906

The minimum cement content shall be 100 kg/m3 and the water : cement ratio by mass shall be between 0.3 and 0.45:1

The mortar shall stop 100 mm back from the faces of any joints. The end face shall be

vertical.

6.3 Surface Preparation

The interior surface of the pipe to be lined shall be cleaned to remove all rust, chemical or other deposits, oil, grease and all accumulations of water, dirt, and debris. The cleaning of the surface shall be carried out by the use of suitable chemical or mechanical means to the approval of the Engineer. The extent of cleaning shall be to the satisfaction of the Engineer.

All loose mill scale, dirt, rust, and accumulation of construction debris shall be removed from the interior of the steel pipeline. The pipeline shall be cleaned by use of a power-driven cleaner incorporating revolving brushes on rotating arms.

Immediately prior to the travel of the lining machine through the pipeline, all foreign material shall be removed. This includes small sand and loose mortar that might have accumulated since the work of preparation of surfaces was completed.

6.4 Mix Proportion

Proportion of sand to cement shall not be more than 1.5 parts sand to 1 part by volume. Mortar composing of cement, sand and water shall be well mixed and of proper consistency to obtain a dense, homogeneous lining that will adhere firmly to the pipe surface. The cement mortar mix shall comply with strength and density requirements specified in IS 11906/AWWA C602. No admixtures shall be permitted unless approved by the Engineer.

6.5 Thickness of Lining

The lining shall be placed by centrifugal method in one course by a machine traveling through the pipe and discharging the mortar at a high velocity over all pipe sections and long radius bends. The discharge shall be from the rear of the machine so that the freshly applied mortar will not be marked. The rate of travel of the machine and the rate of mortar discharge shall be mechanically regulated so as to produce uniform thickness throughout. The mortar must be densely packed and shall adhere to the pipe wherever applied.

6.6 Surface Finish

Mortar lining shall be mechanically trowel led except for the places where hand toweling is expressly permitted by the Engineer.

The lining shall be provided with attachments for mechanically trowel ling the mortar. Both the application and toweling of the mortar shall take place at the rear of the machine so that the freshly placed and trowel ling of the mortar will not be damaged. The trowel attachment shall be such that the pressure applied to the pipe will be uniform and produce a lining of uniform thickness with a smooth and even finished surface free of spiral shoulders. The finished surface of machine placed and trowel led linings in pipe shall be examined according to the following procedure.

Thickness of lining shall be ascertained frequently during placing of mortar and trowel ling using an approved non-destructive method.

In the stretch of pipe that has been lined and trowel led in each day’s run, ten places shall be selected in straight sections of the pipe by the Engineer. In each of the ten places the thickness of the lining shall be re measured by non-destructive means as directed by the Engineers.

Defects in lining including but not restricted to sand pockets, voids, over sanded areas, blisters, cracked and dummy areas, and thin spots shall be removed, and the area shall be repaired to the full required thickness of the mortar lining. Defective areas encompassing the full diameter to the pipe shall be replaced by machine. Defective

lining rejected at the time of lining shall be removed before initial set of the mortar. Defective lining rejected after initial set shall be replaced or repaired by the most practical method as determined by the Engineer.

Hair cracks or cracks up to 0.25 mm width and not over 300 mm in length in finished linings may be considered acceptable at the discretion of the Engineer but larger cracks shall be repaired or removed and redone all as directed by the Engineer.

6.7 Hand application

Cement mortar lining of bends, specials, areas closely adjacent to valves and other such places where machine placing may not be practical shall be performed by hand. The Engineer may order the correction for any defect by hand application.

Cement mortar for hand work shall be of the same materials as the mortar for machine placed lining.

The areas to be lined shall be thoroughly cleaned as specified earlier and, if necessary, shall be moistened with water immediately prior to placing the hand- applied mortar.

Steel finishing trowels shall be used for the hand application of cement mortar, except at bends the outer edges of hand trowel led areas may be brushed in odder to reduce the abutting offset.

All hand finishing work in a section of the pipeline shall be completed within 24 hours after completion of the machine application of mortar lining that section. If necessary, application of mortar lining by machine shall be delayed or stopped to assure compliance with this schedule.

Hand placed mortar shall have a uniform and smooth surface with smooth transitions to adjacent machine placed linings.

6.8 Curing

Curing shall commence immediately after completion of the mortar lining and hand finishing of a section of pipeline. This shall, not be later than 8-hours after mixing of mortar. The lining shall be kept continuously in moist condition for a period of 14 days. During the operation of lining, finishing and curing, exterior surface of the pipe exposed to sunlight shall be sprinkled with enough water to keep the pipe cool. Open ends of pipes shall be suitably closed so as to maintain a moist atmosphere and prevent draught. Curing of mortar lining and simultaneous cooling of the pipeline externally shall be continued even beyond the period of 14 days if so directed by the Engineer.

6.9 Tests

Test blocks of the same material as used for the lining shall be made in 150 mm cube moulds and subjected to cube crushing tests. Each block shall be removed from its mould as soon as practicable and cured under the conditions of temperature and humidity identical with those in which the lining of the pipe is cured. The number of tests shall be at least 4 cubes for each age and water cement ratio for each days work. The work cube strength of the test cube shall not be less than 300 kg/cm^2 after 28 days of curing or 170 kg/cm^2 of 7 days of curing. The density of the test cube shall not be less than 2300 kg/m^3

6.10 Backfilling

On completion of the pipe laying operations in any section, for a length of about 100m and while further work is still in progress, refilling of trenches shall be started by the contractor with a view of restricting the length of open trenches. Pipe laying shall closely follow the progress of trench excavation and the contractor shall not permit unreasonably excessive lengths of trench excavation to remain open while awaiting testing of the pipeline. If the Engineer considers that the contractor is not complying

with any of the foregoing requirements, he may prohibit further trench excavation until he is satisfied with the progress of laying and testing of pipes and refilling of trenches. Filling to a level of 300 mm above the crown of the pipe shall be done in accordance with the requirements of the clause on bedding. Care shall be taken during backfilling, not to injure or disturb the pipes, joints or coating. filling shall be carried out simultaneously on both sides of the pipe so that unequal pressure does not occur. walking or working on the completed pipeline shall not be permitted unless the trench has been filled with the instructed bedding and surround material, up to height of at least 300 mm over the top of the pipe except as may be necessary for trapping etc., during backfilling work.

The remaining portion of the trench shall be filled in which selected excavated material free from and topsoil, vegetation or boulders and colds of earth larger than 75 mm in size. Filling shall be done in layers not exceeding 150 mm in thickness accompanied by adequate watering, ramming etc., so as to be compacted to 95 % of the maximum dry density as per Part 7 of IS: 2720. The water contents of the soil shall be kept near the optimum moisture content as possible. The trench shall be refilled so as to build up to the original ground level, keeping due allowances for subsequent settlement likely to take place. The surface of the refilled excavation shall be left slightly higher than the adjacent ground and be maintained by the contractor to a smooth even slope.

The Engineer shall, at all times, have powers to decide which portion of the excavated materials shall be used for filling and in which portion of the site and in what manner it shall be used.

If suitable material for refilling is not available from already excavated material the Contract shall import material of approved quality as directed by the Engineer.

Regular measurement of the field dry density shall be taken by the Contractor at various levels in the backfilling as required by the Engineer.

No mechanical plant other than approved compacting equipment shall run over or operate within the trench until backfilling has reached its final level or the approval for the Engineer has been obtained.

Should any subsidence take place either in the filling of the trenches or near about it during

The works the Contractor shall make good the same at his own cost.

Surplus excavated material shall be used to fill in any low spots above the pipeline which are identified on the Drawings or are instructed by the Engineer. Such material shall be evenly placed and compacted in layers not exceeding 200mm thick after compaction. The method of compaction employed shell achieve not less than 90% maximum dry density as determine from IS 2720: Part 7. Unless approved of by the Engineer, the width of areas to be filled shall not exceed 20m.

6.11 Material of Construction:

Body: Cast steel (Conforming to ASTM A216 Gr WCB)
Disc: Cast steel (Conforming to ASTM A216 Gr WCB)
Shaft: Stainless Steel (BS 970 431 S29)
Seat Ring: Stainless Steel: ASTM A 743 CF8
Bearing: Teflon

Size of valves and pressure rating as per Bill of Quantities. Location of valves shall be as per contract drawings.

The contractor shall provide test certificates for materials, strength and leakage shall in accordance with BS5155 or relevant international standards.

6.12 Nuts, Bolts and Washers

Unless otherwise specified, nuts, bolts and washers shall be galavanished and/or zinc electroplated conform to the requirements of IS 1364. Bolts shall be of sufficient length that at least one thread but not more than three threads shall show through the nut when in the fully tightened condition.

6.13 Anchor Blocks

Anchor blocks shall be provided at horizontal bends, vertical bends/ and at intervals on pipelines with gradients in excess of 1 in 6 as noted on the drawings, and at other locations ordered by the Engineer. The anchorages shall be made from concrete and constructed to the dimensions shown on the drawings. Where faces of anchor blocks are shown to bear against undisturbed ground, the contractor shall take all necessary measures to ensure that such bearing is given over the full dimensions shown.

Curves formed by welded bends and pipe lengths will not require anchoring unless specifically shown in the drawings.

Welded pipelines shown on the drawings as having tied couplings an flanges shall require anchor blocks only at the positions specifically noted on the drawings.

6.14 Measurement and Payment

The measurement of the pipes for items specified in Bill of Quantities shall be on running meters of net length along the centerline of the pipe excluding the length of specials and appurtenances.

Specials shall be paid separately on the basis of provision made in the Bill of Quanitities. For the payment purpose, flanges shall be either included in or excluded as described in the Bill of Quantities. However materials such as nuts, bolts, and washers, etc., shall be included in the respective terms.

Valves shall be paid on number basis as mentioned in the Contract Data.

Payment for fabrication of pipes and specials shall be made after successful testing and delivery to work site. Payment for laying the pipes and specials shall be made as mentioned in the Contract Data.

Lining and coating shall be measured by surface area coated or lined in square meters. For coating the outer diameter (before coating) of pipe barrel shall be considered and for lining internal diameter (before lining) of pipe barrel shall be considered.

VII. ANCILLARY STRUCTURES

7.1 Structures for Crossing Canal/ Nallahs and Other Miscellaneous Structures

Structures for crossing the pipeline over canals/Nallahs and other miscellaneous structures not listed in these specifications but may be required to be built shall be as per construction drawings and as described in Bill of quantities. The materials of construction of workmanship for those structures shall conform to the relevant Standard Specifications. The measurement of quantities involved in these structures for payment shall be done as per dimensions of the respective drawings.

7.2 Grade of concrete

7.3 Ordinary Concrete

In case of ordinary concrete, mix is not required to be designed by preliminary tests and proportions of cement, fine aggregates and coarse aggregates are specified by volume. The ordinary concrete shall be in four grades designated as M 7.5, M 10, M 15 and M 20. It can also be specified by volumetric mix as given in Table-4 below. For cement which normally comes in bags and is used by weight, volume shall be worked out taking 50 kg of cement as 0.035 cubic meters in volume. Shaking, ramming or hammering shall not be done. Proportioning of sand shall be as per its dry volume and in case it is damp, allowance for 'bulkage' shall be made as per IS: 2386 (Part III).

Ingredients required for ordinary concrete containing one bag of cement for different proportions of mix shall be as given in Table-4 below.

Table-4

Ingredients Required for Ordinary Concrete

Grade of Concrete *	**Nominal Mix by volume Cement: Fine Aggregate: Coarse Aggregate****	**Total quantity of dry in kg (max) by mass per 50 kg of cement (to be taken as the individual masses of fine and coarse aggregates)**	**Quantity of water in liters (max) per 50 kg of cement*****
M 7.5	1:4:8	625	45
M 10	1:3:6	480	34
M 15	1:2:4	350	32
M 20	1:1.5:3	250	30

* In the designation of a concrete mix, letter 'M' refers to the mix and the number refers to the specified 28 days' works compressive strength of that mix on 150 mm cubes, expressed in N/ sq. mm.

** The proportions of the aggregate shall be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer and the maximum size of coarse aggregate becomes larger.

*** The amount of water should be kept minimum required for proper workability. The quantity given in the column is not to be exceeded.

7.6 Strength Requirement of Concrete

Where Ordinary Portland Cement conforming to IS.269 or Portland Blast Furnace Cement conforming to IS:455 is used, the compressive strength requirements for various grades of concrete controlled as well as ordinary shall be as given in Table-5. Where rapid hardening Portland cement is used, the 28 days compressive strength requirements specified in Table-5 shall be met at 7 days.

For controlled concrete, the mix shall be so designed as to attain in preliminary tests a strength at least 33 per cent higher than that required on work tests for concrete up to and including M 25, and 25 per cent higher for higher grades. Preliminary tests need not be made in case of 'ordinary concrete'.

Table-5

Strength Requirements

Grade of Concrete	**Compressive test Strength on 150 mm cubes after testing in accordance with IS: 516 (N/sq.mm)**	
	Minimum at 7 days	**Minimum at 28 days**
M 10	7	10
M 15	10	15
M 20	13.5	20
M 25	17	25

In all cases, the 28 days compressive strength specified in Table-5 shall alone be the criterion for acceptance or rejection of the concrete.

Where the strength of a concrete mix, as indicated by tests, lies in between the strength

for any two grades specified in Table-5, such concrete shall be classified for all purposes as a concrete belonging to the lower of the two grades between which its strength lies.

7.7 Use of Plums in Ordinary Concrete

Stone Plums shall not be used unless specified in the drawings. When stone plums are used, the size may be from 150 to 300 mm. The maximum dimension of these stones or plums shall not exceed 1/3rd the least dimension of the members.

All plums shall be hard, durable, clean and free from soft materials or loose pieces or deleterious substances in them and shall not have sharp corners.

During concreting the first layer of concrete of the specified mix shall be laid to a thickness of at least two and a half times the thickness of the maximum size of plums to be used. The plums shall then be laid while the top portion of this concrete is still green but sufficiently stiff to prevent complete submergence of the plums under their own weight. These plums shall be about half embedded in the concrete and the remaining part exposed so as to form a key with the next layer of concrete. No plums shall be used for concrete-laid under water.

While placing the plums, care shall be taken to see that the clear distance between any two plums is not less than either the width or thickness of either of the plums. The distance from plums to the outer surface or from any steel reinforcement shall be equal to greatest width of the plum.

If plums of stratified stone are used, they shall be laid on their natural bed. Stones with concave faces shall be laid with the concave portion upwards. The thickness of the next and successive layers of concrete shall be at least twice that of the largest plums. The total volume of plums shall not exceed 15% of the volume of the finished concrete

SECTION8:DRAWINGS

(Uploaded in e-Procurement Portal separately)

SECTION9:BILLOFQUANTITIES

(Uploaded in e-Procurement Portal separately)

SECTION10:FORMATOFBANKGUARANTEEFORSECURITYDEPOSIT

To: _____[nameofEmployer]

_____ [addressofEmployer]

WHEREAS_____[nameandaddressofContractor]
(hereinaftercalled"theContractor")
has undertaken,in pursuance of Contract No. _____ dated _____ to execute _____[nameofContractandbriefdescriptionofWorks]
(hereinaftercalled"theContract");

ANDWHEREASithasbeenstipulatedbyyouinthesaidContractthattheContractorshallfurnishyouwithaBankGuaranteebyarecognizedbankforthesumspecifiedthereinas security for compliance with hisobligationsinaccordancewiththeContract;

ANDWHEREASwehaveagreedtogivetheContractorsuchaBankGuarantee;

NOWTHEREFOREweherebyaffirmthatwearetheGuarantorandresponsibletoyou,onbehalf ofthe
Contractor, up to a total of Rs._____ [amount of guarantee]
[3]Rupees
_____
[inwords],andweundertaketopayyou,uponyourfirstwrittendemandandwithoutcavilorargument,anysumorsumswithinthelimitsof
-
_____
[amountofguarantee][4]asaforesaidwithoutyourneedingtoproveortoshowgroundsor reasonsforyourdemandforthesumspecifiedtherein.

WeherebywaivethenecessityofyourdemandingthesaiddebtfromtheContractorbeforepresentinguswiththedemand.

We further agree that no change or addition to or other modification of the terms of the Contract or ofthe Works to be performed there under or of any of the Contract documents which may be made between youand the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive noticeofanysuchchange,additionormodification.

ThisguaranteeshallbevaliduntilDaysfromthedateofexpiryoftheDefectsLiabilityPeriod.

SignatureandsealoftheguarantorNameofBank_____
_____
Address_____
Date_____

[3] An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract

[4] An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract